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ABSTRACT

As part of the overall goal of the Environmental Protection Agency (EPA) to help provide environmental professionals with the skills required to plan and deliver training programs, this staff guide, and its related participant reference manual have been developed for conducting a workshop in basic instructional technology. The workshop consists of 12 units totalling approximately 25-35 hours of classroom time if the entire course is presented. Each unit includes an overview, a list of unit options, and lesson plans. Each lesson plan includes a rationale, objective, evaluation activities, resources, and recommended instructional approaches. The emphasis of the units is on the development of the basic, practical skills of: identifying instructional needs; specifying objectives; planning instruction; locating support materials; conducting instruction using various formats and effective speaking techniques; and evaluating the performance of those who receive the instruction. Most of the content is treated on a strictly applied basis with a minimum of theory and technical explanations. The instructional activities include lectures, guided discussions, demonstrations, individual assignments, and readings. Materials in appendices include references and a glossary, a description of other EPA instructional support services and materials, and overhead projector transparency masters. (JN)

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STAFF GUIDE**

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FOREWORD

In 1970, in response to an urgent need for instructors in wastewater treatment plant operations, the U.S. Environmental Protection Agency initiated an Instructor Training Program. The initial "basic" course was developed by Kenneth M. Hay, Education Specialist in the Office of Water Programs. It was designed for persons experienced in plant operations who expected to be training others but who had had no training in instructional methodology and techniques. Course content was continually reviewed and modified as needed, based on experience gained by its presentation to hundreds of novice trainers throughout the country. Some of the training materials were formalized (via a grant) into a staff guide to assist others in similar training efforts.

The Instructor Training Program was later expanded to include an "advanced" workshop for individuals who had completed the basic course and had some experience as instructors, but who needed more background and practice in developing instructional programs. Training materials were developed and several area workshops were conducted with grant funds.

In order to consolidate all the materials resulting from the extensive experience in offering this training, EPA's National Training and Operational Technology Center awarded a contract to Development and Evaluation Associates, Incorporated, of Syracuse, New York. The contractor revised, integrated, and expanded the existing materials to produce complete Staff Guides (including Transparency Masters), and Participant Reference Manuals for (1) a Basic Instructional Technology workshop and (2) an Advanced Instructional Technology workshop. The project was completed in September, 1979.

In FY 1980, NTOTC awarded 11 grants for support of eight Basic IT workshops, three Advanced IT workshops and one combined Basic and Advanced workshop to be conducted by staffs using the support materials. Grantees were to submit evaluations and suggestions for finalization of these materials. The last of these workshops was presented in January, 1981. One of the grantees submitted a proposal to undertake the finalization project, based on the reports from the field tests. Subsequently, a grant was awarded to Utah Technical College at Provo for this project.

The field test data was analyzed and incorporated into the final product. The revised manuals were reviewed by staff of the College of Education, Utah State University. The project was completed in June, 1982.

INTRODUCTION

As part of the overall goal of EPA to help provide environmental professionals with the skills required to plan and deliver training programs, materials and guidelines have been developed for conducting a workshop in Basic Instructional Technology. The information is presented in two manuals, a Staff Guide and a Participant Reference Manual.

The Staff Guide is intended to be used by the instructor in planning and delivering the workshop. The Participant Reference Manual contains materials for student use during the workshop, and is also intended for use "on-the-job" in preparing future instructional activities.

To prepare for delivering this workshop, review all the materials in both manuals. Then, beginning with the Staff Guide section entitled "Workshop Plan and Schedule," proceed to make all the necessary decisions and preparations for delivering the workshop. Planning for this workshop should begin several months before its intended delivery.

DESCRIPTION OF WORKSHOP

The workshop consists of 12 units of instruction totalling approximately 25-35 hours of classroom time if the entire course is presented. A variety of schedules can be used to present the course, ranging from five continuous days to several weekends or a series of half days.

Each unit overview offers options to the instructor. Possible participants are broken into two distinct groups:

1. Speakers who are responsible for short presentations at seminars and workshops and are using objectives and lesson plans.
2. Trainers and superintendents who are responsible for providing lesson plans to speakers, training in a classroom setting, training operators on the job, etc.

When the course is presented, however, the instructor will need to determine the needs of his group and be flexible when determining which of the lessons to present.

Each lesson is described by a complete instructional package worksheet, but the instructor must be flexible in their use in order to be fully successful. The instructional approach sections may be changed to fit the instructor's own style of teaching.

The emphasis of the workshop is on the development of the basic, practical skills of identifying instructional needs; specifying objectives; planning instruction; locating support materials; conducting instruction using various formats and effective speaking techniques; and finally, evaluating the performance of those who receive the instruction. Most of the content is treated on a strictly applied basis with a minimum of theory and technical explanation. The instructional activities include lectures, guided discussions, demonstrations, individual assignments and readings. A variety of instructional methods and media have been included in order to demonstrate the proper use of these techniques.

By the end of the workshop, the concepts and principles composing each topic will have been described and demonstrated and the participants will have practiced their application and received feedback on their performance.

SUMMARY PLAN OF INSTRUCTION

Unit of Instruction	Instructional Method	Time	Content Outline
Unit One Introduction	Lectures Assignments	105-165 Min.	-Introduction to Workshop -Purpose of Workshop -Systematic Approach to Instruction
Unit Two Management of Instruction	Lectures Guided Discussions	105-150 Min.	-Classroom Management -Presentation Management -Questioning Techniques
Unit Three Problem Analysis	Lectures Guided Discussions	65-115 Min.	-Introduction to Problem Analysis -Definitions of Problems -Categories of Problems
Unit Four Task Analysis	Lecture Guided Discussions Assignments	90-120 Min.	-Introduction to Job Analysis -Types and Levels of Behavior
Unit Five Objectives Specification	Lectures Assignments Guided Discussions	165-210 Min.	-Introduction Instructional Objectives -Writing Instructional Objectives -Levels of Objectives

Unit Six Evaluation Techniques	Lecture Guided Discussions Assignment	60-90 Min.	-Nature of Evaluation
Unit Seven Instructional Methods	Lectures Demonstration Guided Discussions Assignments	140-195 Min.	-Introduction -Four Types of Instructional Methods -Selecting Instructional Methods -Exercise in Selecting Methods
Unit Eight Instructional Media and Other Resources	Lectures Assignments Guided Discussions	210-275 Min	-Reasons for Use of Training Aids -Introduction to Types of Training Aids -Selecting Educational Media for Instruction -Sources of Training Materials -Using Training Aids
Unit Nine Lesson Planning	Lecture Assignments	155-210 Min.	-Overview -Principles of Instruction -Exercise in Planning a Lesson
Unit Ten Development of Presentations	Student Presentations	60-150 Min.	-Working from Prepared IPW -Developing an IPW and Presentation
Unit Eleven Presentations	Participant Presentations	90-120 Min.	
Unit Twelve Review and Conclusion	Lecture Guided Discussions	30-90 Min.	-Workshop Summary and Questioning Period -Participants Evaluate Workshop

WORKSHOP SCHEDULE ACTIVITIES

Consider the following points in adapting the workshop schedule to local circumstances.

1. Present the workshop in as concentrated a fashion as possible. For example, presenting the workshop on three consecutive weekends is preferred over a schedule that would spread the workshop over several months.
2. Do not attempt to cover too much in a single day. You should avoid planning for more than 7 1/2 hours of instruction in a single day. Three and a half to four hours of instruction is the limit for an afternoon or evening session (unless it involves a lot of individual activity).
3. Use common sense in dividing units of instruction across two days. Do not subdivide lessons unless absolutely necessary. Only divide units at the lesson level where there is a logical break between lessons.
4. If the workshop is to be offered across a number of weeks, build in extra time at the beginning of each session to review what has already been covered.
5. Do not under any circumstances change the order in which the units are presented. They are designed to build upon one another in sequence.

MILESTONES IN WORKSHOP PLANNING AND PREPARATION

Time in Weeks Prior to Workshop	Activity
Ten	Obtain complete copies of Staff Guide and Participant Reference Manual and review thoroughly.
Nine	Design workshop schedule, select dates and times, secure classroom/meeting space.
Eight	Announce workshop or otherwise establish procedures for determining the participants.
Seven	Check physical requirements for conducting workshop and make necessary arrangements, place orders, etc. - seating - water, coffee - ventilation, heat, light - overhead projector, screen - blackboard or easel - other audio-visual equipment - Xerox and Thermofax equipment - paper, pencils, etc.
Six	Prepare to conduct workshop by thoroughly reviewing the Instructional Package Worksheets (IPW's), Content Outlines, etc. Review the materials under "References" for additional help in unfamiliar areas.
Five	Obtain list of intended participants and send letter with Pre-Workshop Survey.
Four	Prepare the necessary copies of all instructional materials: -Participant Reference Manuals -Overhead transparencies -Slides
Three	Analyze Pre-Workshop Survey.
Two	Prepare final notes for delivering each lesson. Determine the points to be emphasized, examples to be used, etc.
—	Begin workshop.

SAMPLE LETTER TO WORKSHOP PARTICIPANTS

Dear _____,

Welcome to the Basic Instructional Technology Workshop. The workshop will begin on (date) at (time). It will be held in/at (location—include map if necessary). A complete outline of the workshop's scheduled meeting dates and times is enclosed.

You will be one of _____ participants in the workshop. I will be your instructor and we will be using a specially designed set of materials from the Environmental Protection Agency. The purpose of the workshop is to provide you with skills needed to plan and deliver effective training programs. Instructional activities will include lectures, discussions, assignments and practice sessions. As part of the workshop, you will receive a Reference Manual useful for planning and conducting your own training sessions in the future.

I am looking forward to conducting this workshop. To help my preparation for these sessions, I am interested in learning as much as possible about the backgrounds of the participants. With this information, I will be able to adapt the instructional presentations to fit your backgrounds. Therefore, would you please take the time now to complete the enclosed survey and mail it to me in the stamped self-addressed envelope provided.

Thank you for helping me prepare for this workshop. I look forward to seeing you on the (date). If you have any particular questions before then, you can reach me at (phone number).

Sincerely,

PRE-WORKSHOP SURVEY

Name _____ Occupation _____

1. Reason for taking this workshop:

2. Indicate your teaching experience?

___ 0-1 year ___ 1-3 years ___ 3-5 years ___ over 5 years

Describe your teaching assignment.

3. Do you know how to operate any audio-visual equipment?

___ 16mm projector ___ overhead projector
___ 35mm projector ___ video playback machine

4. Have you ever developed instructional/training materials or designed a workshop?

___ yes ___ no

Please describe your experience in this area.

5. Have you ever created and used tests and rating scales or planned and carried out an evaluation of employee job performance?

___ yes ___ no

Explain:

6. What do you see as the most important training need in your work setting for yourself or others?

Thank you for your help.

TRAINING RESOURCES

This workshop is designed to be conducted by one instructor working with 12 participants. However, given the rather intense instructional load and tight timelines, it would be highly advisable to have it conducted by two instructors working a team-teaching arrangement. In order to maintain desired levels of feedback and individual assistance, a second instructor becomes a virtual necessity for workshop enrollments in excess of 12 participants.

The instructor of this workshop should be an experienced teacher or trainer with at least some limited familiarity with the activities and work settings of environmental personnel. Instructors are not expected or required to have any particular backgrounds in the theory and application of all the various instructional technology and evaluation subjects covered in the workshop. References are provided for specific subject areas (listed in Addendum A) if the instructor desires to strengthen his preparation.

Facilities and Equipment

Minimum Requirements:

1. A comfortable, well-lighted classroom area with tables or individual desks for the learners.
2. A chalkboard, overhead projector and screen, and lighting control equipment. (If the use of an overhead projector is an absolute impossibility, the figures intended as transparencies can be copied and used as handouts.)
3. A Xerox or Thermofax machine for making transparencies.

Recommended Additions:

1. Additional nearby rooms or workspace of some kind in which small groups of participants can meet to work or individuals can practice presentations.
2. Carousel-type slide projector, 16mm motion picture projector, cassette and/or reel-to-reel tape playback units (and sample films, slides and tapes.)

USING THIS STAFF GUIDE IN PLANNING AND CONDUCTING THE WORKSHOP

The Staff Guide is designed to provide you with all the basic information you need to plan and conduct the workshop. There are 12 units of instruction, most of which are subdivided into individual lessons. Each unit is summarized in a Unit Overview and the lessons are described in detail in individual Instructional Package Worksheets (IPWs). Most of the lessons also have accompanying Support Materials for use in delivering the instruction. Support Materials may consist of Content Outlines (for conducting lectures or guided discussions) and Figures (for overhead transparencies). Conduct of a given lesson may also depend heavily upon material in the Participant Reference Manual (in which case the use of such material is noted on the lesson Instructional Package Worksheet).

To plan the workshop, begin by reviewing all of the Unit Overviews and Instructional Package Worksheets to get an overall picture of the workshop's activities. Then go back through the material and study each unit and lesson in detail - including any accompanying materials in the Participant Reference Manual. Finally, complete the necessary preparations for delivering each lesson. Depending on the lesson, this may involve preparing transparencies or making slides. Make sure you also allow adequate time to prepare your own lectures - Content Outlines are not designed as scripts for lectures; but only as outlines of key instructional points and activities.

The function and contents of the Unit Overviews, Instructional Package Worksheets and various other materials contained in this manual are explained below.

Unit Overviews

Unit Overviews are designed to describe the activities of a whole unit of instruction. For most units, the overview summarizes the information and objectives contained in lesson Instructional Package Worksheets. The standard Unit Overview consists of the following parts:

Overview: A summary of the unit's instructional content and its relevance to the overall goal of the workshop.

Options: Suggestions on which lessons the speakers should receive. The course in its entirety, except for Unit 12, Lesson 1, is intended for trainers and superintendents.

Content Outlines

Content Outlines expand upon the directions given under the "Instructional Approach" section of the Instructional Package Worksheets. They provide an outline of the content points to be included in lectures. When necessary, they also include detailed directions to the instructor on the conduct of the lesson.

Content Outlines are not intended to replace the instructor's lesson and lecture planning activities. Rather they are intended to provide a framework and brief illustration of the intended design of the lesson. They should also help the instructor to fit the actual workshop activities within the estimated time frames. (Instructors should take particular care to develop and practice their lectures to fit within the available time. If a lecture is too short or too long, the content outline should be reviewed and the level of detail contained in the lecture reconsidered.)

Figures

Figures have been designed for most of the lessons. They are illustrations designed to highlight, emphasize, or clarify the content of a lecture, discussion, or other activity. They are listed as "Resources" in the Lesson Instructional Package Worksheets (IPWs) and masters are located in Addendum D.

The Figures are designed to be used as overhead transparencies or slides. (Use a Xerox or Thermofax machine and appropriate transparency film to create transparencies from the printed materials provided.) Specific use of the Figures is noted in the "Instructional Approach" section of the IPWs and in the Content Outlines. Figures are numbered sequentially by units. To add interest in the overheads, use colored acetate or color the figures with felt pens. If a unit has numerous figures, color them in and have them made into slides.

Summary of Unit Activities: A brief outline of the unit including lesson titles. Instructional methods/activities and their estimated duration, and a list of the specific support materials provided in the Staff Guide for conducting the instruction.

Lesson Instructional Package Worksheets

For almost every unit which is subdivided into individual lessons, each lesson is described in detail on individual Instructional Package Worksheets. The standard Instructional Package Worksheet consists of the following components:

Entering Competencies: The prerequisite skills and knowledge which participants should possess before beginning the lesson.

Justification: An explanation of the importance and role within the unit and the workshop as a whole.

Objective: The specific objective for that lesson stated in behavioral terms.

Evaluation Activities: A description of those activities through which participant achievement of the lesson's objective is to be observed and/or judged.

Resources: A list of the specific support materials included for use in conducting the lesson's instructional activities.

Instructional Approach: A general set of directions for conducting the lesson. Typically these directions indicate the overall approach to be taken by the instructor along with an outline of key events.

Support Materials

Support materials are the specific resources provided for conducting the instruction. There are two main types of support materials included in the Staff Guide: Content Outlines and Figures.

UNITS OF INSTRUCTION

BASIC INSTRUCTIONAL TECHNOLOGY

UNIT ONE INTRODUCTION - Unit Overview

Overview:

The explicit purpose of this unit is to introduce the workshop and explain its focus on a systematic approach to instruction. As a means of improving instructional effectiveness, the unit begins with participant introductions and brief presentations of personal experiences with good and bad instruction. The secondary purpose of this exercise is to encourage participants to speak before a group.

Options:

All of the students need the three lessons of Unit I, however, the following changes may be appropriate.

1. Speakers:

Lesson 2 - Note that the IPW will be provided for them. However, the Instructional Approach is only a blueprint for their own activities and style. During the workshop, they will learn a method for determining an Instructional Approach and what their options are for changing it to fit their own teaching style. When delivering an already planned lesson, they will have flexibility in their approach as long as they successfully meet the lesson's objectives.

Lesson 3 - Note that although the Analysis and Design phases have already been completed, they will have some flexibility to change the decisions made in the Development phase. Delivery and Revision is the primary phase of interest to them.

2. Other Participants: No change

Summary of Unit Activities

Lesson Title	Instructional Methods	Time	Support Materials
1. Introduction to the Qualities of Good Instruction	Lecture; Assignment	60-75 Min.	Fig. 1.1 Assign. 1.1
2. The Purpose of this Workshop	Lecture	15-30 Min.	Content Outline Fig. 1.2
3. Systematic Approach to Instruction	Lecture; Assignment	30-60 Min.	Content Summary Fig. 1.3 Assign. 1.2

UNIT ONE: INTRODUCTION

LESSON 1 of 3: INTRODUCTION TO THE QUALITIES OF GOOD INSTRUCTION

Estimated time:

75 minutes

Entering Competencies:

None

Justification:

This lesson provides justification for the entire workshop as participants learn that "good instruction" is the product of a systematic process rather than a result of chance.

Objective:

The workshop participants will describe several qualities of good instruction from memory or from notes. Each participant will give at least two examples and explain them to a group.

Evaluation Activities:

The instructor will observe the ability of each participant to perform the above stated objective.

A further check will occur on the review assignment at the end of the complete unit. The instructor should also watch the presentations carefully to identify people who have trouble speaking to a group. These participants may require special assistance in subsequent workshop activities.

Resources:

Instructor:

-Fig. 1.1 - Unit One Outline

Participants

-Assign. 1.1 - Qualities of Instruction

Note Sheet

Instructional Approach:

1. Instructor's introduction

Welcome the participants, hand out name tags, etc., according to your personal teaching style. Introduce yourself and explain that this workshop will enable each of them to learn some techniques for becoming better instructors. Using Figure 1.1, outline the

lessons in this unit. Explaining the first activity will be a discussion of the qualities of good instruction.

2. Participants' introductions and presentations.

Ask the students to turn to the Qualities of Instruction note sheet (pg. 5) and explain that each person will be asked to stand, give name, occupation, and reason for taking the workshop and speak to the issue of good vs. bad instruction. Participants may outline and explain examples of each, may illustrate the subject with personal experiences, etc. Tell them each to speak for five minutes. If individuals seem uneasy or hesitant, volunteer to go first.

If the group is larger than ten people, split the group in two and assign a student as the notetaker for the second group.

After the groups are back together, direct the discussion to the point that instructor preparation and the instructor's accurate perception of his students are very important factors leading to better instruction. Point out that these are the topics which will be dealt with in this workshop.

Your job throughout this lesson includes:

- making each speaker feel at ease.
- encouraging reluctant or reticent speakers to continue until five minutes is over.
- restricting talkative speakers to five minutes only.
- keeping the presentations on the subject.
- note taking, summarizing, etc., on a chalkboard or overhead projector.

UNIT ONE: INTRODUCTION

LESSON 2 of 3: THE PURPOSE OF THIS WORKSHOP

Estimated time:

15-30 minutes

Entering Competencies:

None

Justification:

In order to produce quality instruction, instructors will need to plan for it and know their students. They will need some format to summarize key elements involved in planning. The Instructional Package Worksheet (IPW) is one of the formats EPA uses for this purpose.

Objective:

Participants will explain, from memory, that the purpose of this workshop is to learn to plan instruction systematically using the Instruction Package Worksheet, taking into account individual student needs.

Evaluation Activities:

Evaluation of the lesson will take place on the review assignment for this unit.

Resources:

Instructor:

-Content Outline

-Fig. 1.2 - Instructional Package Worksheet

Participants:

-Content Summary

-Instructional Package Worksheet

Instructional Approach:

Building on the participant presentations in Lesson 1, state that one very important way to develop effective and efficient instruction is through systematic planning.

Using Fig. 1.2, introduce the IPW (pg. 6 and 7 in Participant Reference Manual) and explain that it is one format used by EPA to summarize key elements of a plan for instruction. Go through the forms line by line indicating the kinds of information requested. Explain that the reasons for including each piece of information will become apparent as we reach other lessons in this workshop.

(Due to lettering size requirements, the IPW transparency begins with "Estimated time." Later in the course you may want to fill out this IPW as a demonstration, using non-permanent transparency pens.)

Complete the lesson by explaining that students will be able to complete an IPW for their own training activities by the end of the course. Also note that the basic format can be changed to meet their needs as trainers.

(If you are unfamiliar with the IPW format or have not used one yourself, you may wish to refer to the content outline which follows.)

UNIT ONE: INTRODUCTION
LESSON 2 of 3: THE PURPOSE OF THIS WORKSHOP

Content Outline

INSTRUCTIONAL PACKAGE WORKSHEET EXPLANATION

CURRICULUM: (TITLE)

COURSE: (TITLE)

UNIT (NUMBER): (UNIT TITLE)

LESSON (NUMBER) of (TOTAL NUMBER OF LESSONS IN UNIT):
(LESSON TITLE)

Estimated time:

(NUMBER OF MINUTES TO COMPLETE LESSON)

Entering Competencies:

(Previous skills/ knowledge needed to begin this lesson.)

Justification:

(Statement explaining the importance of the lesson and the value of the skill/knowledge to be gained.)

Objective:

(What behavior the participants as trainees will demonstrate, under what conditions, and with what degree of performance.)

Evaluation Activities:

(The method or methods by which learners' successful completion of the lesson objectives is measured.)

Resources:

(Support materials used by the instructor during the lesson.)

Instructional Approach:

(Description of the sequence of activities through which the trainees will gain mastery of the objectives, stated in terms of what the instructor will do.)

UNIT ONE: INTRODUCTION
LESSON 3 of 3: SYSTEMATIC APPROACH TO INSTRUCTION

Estimated time:

30-60 minutes

Entering Competencies:

None

Justification:

This lesson provides a framework upon which the instruction of this workshop is built. It reinforces the concept that good instruction is the result of systematic planning.

Objective:

Participant will list the four phases of a systematic approach to instruction and the tasks included in each.

Evaluation Activities:

Review assignment to be completed at the end of this lesson.

Resources:

Instructor:

- Content Summary
- Fig. 1.3 - The Systematic Approach to Instruction
- Assign. 1.2 - Answer Key

Participants:

- Content Summary
- Assign. 1.2 - Review assignment

Instructional Approach:

Using Figure 1.3, present and explain the four phase model. (Participants have a summary of the model in their reference manuals, pg. 8.) Explain that the units of the workshop teach specific procedures for performing each of the functions given in the model.

Further underscore the relevance of this instruction by pointing out that each of these procedures will yield specific information for use in filling out the Instructional Package Worksheets.

Finally, briefly describe the remaining units of the workshop.

Have participants complete the Assign. 1.2 pg. 9.
When they have finished, call on students to read
their answers while the others correct their
papers.

This exercise will serve both as a review for Unit
I and an evaluation of progress.

UNIT ONE: INTRODUCTION
LESSON 3 of 3: SYSTEMATIC APPROACH TO INSTRUCTION

Content Summary

This workshop will show how to plan effective training according to the following model.

Phase One: ANALYSIS

1. Define the problem.
2. Analyze the tasks.

Phase Two: DESIGN

3. Specify instructional objectives.
4. Determine evaluation activities.

Phase Three: DEVELOPMENT

5. Select instructional methods and media.
6. Develop instructional strategies.

Phase Four: DELIVERY

7. Deliver instruction.

UNIT ONE: INTRODUCTION

LESSON 3 of 3: SYSTEMATIC APPROACH TO INSTRUCTION

Assignment 1.2 - Answer Key

ANSWER KEY

1. List two good qualities of instruction.

(Answers will vary)

2. Good instruction requires a (systematic) approach.

3. List the four phases of the systematic approach to instruction, including both tasks under each phase.

Analysis: Define problem, analyze tasks.

Design: Specify instructional objectives, determine evaluation activities.

Development: Select instructional methods and media, develop instructional strategies.

Delivery: Deliver instruction.

BASIC INSTRUCTIONAL TECHNOLOGY

UNIT TWO

MANAGEMENT OF INSTRUCTION - Unit Overview

Overview:

No matter how well planned and prepared the instructor, failure to consider and control certain variables in the classroom environment can severely lessen the effectiveness of instruction. This unit introduces variables in the physical and interpersonal environment that the instructor should consider in planning a class. Techniques for managing the class and maintaining attention are also described.

Options:

All students will need the entire unit.

Summary of Unit Activities

Lesson Title	Instructional Methods	Time	Support Materials
1. Classroom Management	Lecture; Guided Discussion	45-60 Min.	Content Outline Fig. 2.1-2.17
2. Presentation Management	Lecture; Guided Discussion	30-45 Min.	Content Outline Fig. 2.18-2.20
3. Questioning Techniques	Lecture; Guided Discussion	30-45 Min.	Content Outline Fig. 2.21-2.22

UNIT TWO: MANAGEMENT OF INSTRUCTION
LESSON 1 of 3: CLASSROOM MANAGEMENT

Estimated time:

45-60 minutes

Entering Competencies:

None

Justification:

A variety of physical and psychological variables can have a serious impact upon the effectiveness of instructional presentations. This lesson reviews those variables which can be controlled through careful management of instructional activities in the classroom.

Objective:

In a guided discussion, participants will draw upon their personal experiences and identify important variables in the physical and interpersonal environment of the classroom and predict the impact of at least one variable upon instructional effectiveness. In general discussion, each participant will describe and provide an example of at least one technique for managing the class and maintaining attention.

Evaluation Activities:

Instructor will insure that participants have accomplished the unit's objectives through their participation in class.

Resources:

Instructor:

-Content Outline

-Fig. 1.1 - Unit One Outline

- 2.1 - Environmental Influence**
- 2.2 - Physical Environment**
- 2.3 - Psychological Environment**
- 2.4 - Planning Considerations**
- 2.5 - Managing Techniques**
- 2.6 - Lesson Plan**
- 2.7 - Don't Talk Too Much**
- 2.8 - Divide Talks**
- 2.9 - Frequent Breaks**
- 2.10 - Comfortable Room**
- 2.11 - Arrange Furniture**
- 2.12 - Clean Room**
- 2.13 - Handouts**
- 2.14 - Provide Handouts**

- 2.15 - Training Aids
- 2.16 - Pre-draw
- 2.17 - Eliminate Distractions

Participants:
-Content Outline

Instructional Approach:

This lesson begins with a brief introductory lecture on the impact the environment can have on instruction. This is followed by a guided discussion of the physical and psychological factors which may impede learning. Finally, a discussion and summary lecture on techniques for controlling these factors and minimizing their effects should be planned.

1. Using Fig. 1.1, ask students to visualize the screened boxes around the instructional development tasks as the students and potential barriers to communication. When developing and presenting instruction, these must always be considered.
2. Introduce the topic of environmental influences on learning and instruction.
3. Conduct a discussion on the physical and psychological environment of the classroom. Have each participant suggest a specific characteristic and describe its potential impact upon instructional effectiveness. (See content outline.) List the points as they are generated.
4. Ask participants to suggest techniques for managing the class and maintaining attention that will control environmental factors or limit their effects. Call upon individual participants to suggest techniques and give examples. Give a brief lecture summarizing the techniques for overcoming problems with the environment (listed in the content outline).

UNIT TWO: MANAGEMENT OF INSTRUCTION
LESSON 1 of 3: CLASSROOM MANAGEMENT

Content Outline

I. Introduction (Use Fig. 1.1)

- A. Background information concerning students and training location must be taken into account during the entire instructional development process. Ignoring these facets can doom a training exercise to failure.
- B. Environmental influences on instruction are illustrated by a simple model of the process of instructional communication. (Use Fig. 2.1) The environment may either change the instructional message before it reaches the learner, or affect the learner's ability to receive it.
- C. Two major kinds of environmental influences may impact instructional communication:
 - 1. Physical environment - the setting for the instruction.
 - 2. Psychological environment - the learner's attitudes and dispositions towards the instruction or the setting.
- D. Summary of this lesson's objectives.

II. Environmental Effects on Communication

- A. Effects of physical environment on communication.

Lead class in guided discussion in which you call upon participants to first identify an important physical characteristic of instructional effectiveness. Some of the characteristics that should be introduced include: classroom size, classroom furnishings, classroom arrangement, lighting, acoustics, class size, time of day, and length of class. If the discussion is slow in starting give the first example: (i.e., describe how poor acoustics can affect communication by either making it impossible to hear the message, or by making it so difficult that the trainee gets tired and stops paying attention.) Use Fig. 2.2 to summarize the discussion by listing the identified environmental characteristics and their effects.

B. Effects of the psychological environment on communication.

Continue the preceding discussion, calling upon the participants to describe how the psychological environment can affect instructional communication. Some of the points that should be considered include: teacher attitudes towards the class or the subject of instruction, age of the trainee, trainee attitudes towards the teacher, and the subject of instruction, motivation and rewards for training, and the interpersonal relationships of the trainees with each other and the instructor. Summarize the discussion using Fig. 2.3 on the overhead projector (or use the blackboard).

III. Techniques for Overcoming Problems with the Physical or Psychological Environment

Have participants suggest planning considerations and techniques for managing instruction. In your summary lecture, cover any of the points below which may not come up in the discussion.

A. Things to consider in planning instruction: (Use Fig. 2.4)

1. Selection of instructional methods and media to accommodate the physical environment.
2. Development of rewards for motivating students.
3. Planning the teaching schedule to allow for breaks, questioning periods, etc.
4. Determining the degree of formality/informality you wish to maintain in the classroom.

B. Techniques for managing the class and maintaining attention: (Use Fig. 2.5)

1. Introduce the class by explaining what is to be taught and outlining the instruction. Explain how it meets the needs/interests/backgrounds of the learners.
2. Keep learners informed of progress through the instruction (i.e., "the second point that must be explained...", "the last exercise for today...").
3. Keep attention focused on key instructional points through verbal directions or emphasis (i.e., "what's important here is..."). Use media or graphic techniques to highlight points.

4. Maintain high levels of learner participation in the instruction.
 - a. Frequent questions and exercises.
 - b. Use of instructional methods other than the lecture. (i.e. instructional role playing and simulations, films, field experiences to observe instructional content, etc.)
5. Pace the instruction appropriately for the particular group of learners. Use a variety of instructional media and methods.
6. During lectures, move closer to the class and/or move around the room if attention is slipping. Stand closest to, or lecture at, those who appear to be falling asleep.
7. Counsel "problem" or disruptive learners outside of class.
8. Be fair and considerate to all members of the class.

C. Practical classroom tips. (Use Fig. 2.6-2.17)

Note: If Fig. 2.6-2.15 are used, they should be made into slides or pre-drawn on a flip chart.

1. Use the lesson plan. Changing horses in midstream will confuse the learners.
2. Don't talk too much and dominate a guided discussion session.
3. Divide theoretical talks into small segments.
4. Allow frequent breaks.
5. Insure the room and furniture are comfortable.
6. Arrange the furniture to fit your needs prior to the trainees' arrival.
7. Insure the room and furniture are clean and free from clutter.

8. Disseminate handout materials before or after class to cut down on wasted class time.
9. Provide all materials that will be referred to during the session.
10. Try out training aids before the class begins and have projectors loaded or threaded.
11. Pre-draw or sketch on the chalkboard.
12. Eliminate distractions.

UNIT TWO: MANAGEMENT OF INSTRUCTION
LESSON 2 of 3: PRESENTATION MANAGEMENT

Estimated time:

30-45 minutes

Entering Competencies:

Students must realize that teaching, resulting in learning, is a type of communication and the instructor's presentation skills will impact the learning process.

Justification:

The most efficient means of communicating information to large groups in a short time is the lecture. However, lecturing is more than merely the delivery of information. To be effective, the lecture must combine a well-organized and attractive content with skill in oral presentation. The lecturer must speak in a relaxed and informal manner, with clear and varied voice tones and diction, and in language relevant to the audience. This lesson introduces techniques for successful oral presentation of lectures.

Objective:

Given a list of both ineffective and effective oral presentation techniques and mannerisms, participants will separate those which increase presentation effectiveness from those which decrease or prevent effectiveness.

Evaluation Activities:

Participant understanding of the content of this lesson will be evaluated during the guided discussion.

Resources:

Instructor:

- Content Outline
- Fig. 2.18 - Spoken Delivery
 - 2.19 - Non-distracting Delivery
 - 2.20 - Organized Delivery

Participants:

- Content Summary

Instructional Approach:

This lesson consists of two activities, a guided discussion and a lecture. Figures accompany the presentation. Their use is keyed in the content outline.

1. Begin by reinforcing to the participant that the effectiveness of their oral presentations will directly impact the learning of their students.
2. Introduce the guided discussion question and solicit responses.
3. Present the rules for effective oral presentations using Fig. 2.18 - 2.20.

UNIT TWO: MANAGEMENT OF INSTRUCTION
LESSON 2 of 3: PRESENTATION MANAGEMENT

Content Outline

I. Introduction

Lesson 2 focuses on necessary skills for presenting content in oral forms such as lecture. Emphasize the importance of the ability to speak in a relaxed and effective manner. Inform participants that they will put into practice skills gained through the first eight units during their formal oral presentation in Unit Ten.

II. Guided Discussion Question

"You have all listened to speeches and presentations by trainers and public speakers that were memorable because they were very good or very bad. What aspects of those presentations do you recall as being particularly effective or ineffective?"

Begin the discussion by asking participants to recall trainers and public speakers whose oral presentation abilities were memorably good or bad. Ask them to describe the lecturers and speakers they recall, identifying aspects of the oral presentations considered particularly effective or ineffective. Be careful not to let the discussion descend into a mere anecdote-telling session. Allow 15 minutes for the discussion.

III. Lecture: Rules for Effective Oral Presentations

Formally present the rules for effective public speaking given below. Whenever possible, tie the rule to the previous discussion. Use Fig. 2.18-2.20 to emphasize the rules. Inform participants that the Participant Rating Scale found later in their manuals can serve as a checklist for evaluating their own and others' presentations. Stress the informality of training program lectures and the need for instructors to be responsive to trainees' questions during the presentation.

A. Oral presentations must be spoken, not read. (Use Fig. 2.18)

1. Maintain eye contact with audience.
2. Use humor to establish and maintain rapport with the audience.
3. Use a variety of voice tones and volumes.
4. Create an atmosphere of informality by appearing relaxed.

5. Use language that is appropriate for the audience.
 6. Check frequently to determine degree of audience interest and understanding.
 7. Allow space for occasional questions and comments from the audience.
 8. Show enthusiasm for the topic.
- B. The speaker's body must not distract from the content of the presentation. (Use Fig. 2.19)
1. Be poised; do not pace around, shuffle feet or papers, or wave hands.
 2. Avoid talking to audience while facing a blackboard or using other media.
 3. Reduce unnecessary and distracting hand and body movements.
- C. The presentation must be organized and logical. (Use Fig. 2.20)
1. Orient the audience to the topic to provide motivation for listening.
 2. Inform the audience of the structure of the presentation.
 3. Emphasize major points using media as appropriate.
 4. Summarize major points at the end.

UNIT TWO: MANAGEMENT OF INSTRUCTION
LESSON 3 of 3: QUESTIONING TECHNIQUES

Estimated Time:

30-45 minutes

Entering Competencies:

Successful completion of Lessons 1 and 2.

Justification:

Questions can enhance learning if used correctly. Therefore, instructors must learn the techniques for asking "good" questions.

Objective:

Given sample questions, the student will analyze them and correct any errors, demonstrating principles taught in this lesson.

Evaluation Activities:

Participant understanding of the content of this lesson will be evaluated during the guided discussion.

Resources:

Instructor:

-Content Outline

-Fig. 2.21 - Questions: Student

-2.22 - Questions: Instructor

Participants:

-Content Summary

Instructional Approach:

1. Note that instructional communication includes questions that are asked by both instructors and students. Determined by how and when questions are asked, they can either serve a useful learning function or they can waste time.
2. Use the content outline to deliver the lecture and guide the discussion.
3. To conclude, ask several sample questions and have the students orally critique them.

UNIT TWO: MANAGEMENT OF INSTRUCTION
LESSON 3 of 3: QUESTIONING TECHNIQUES

Content Outline

I. Introduction

Develop a discussion around the reasons for asking questions, utilizing Fig. 2.21 - 2.22. Point out that the asking of questions can serve as an aid to the student or the instructor. Summarize the discussion to include the following:

- A. Questions as an aid to the student.
 - 1. Alert him to the main points.
 - 2. Require his participation.
 - 3. Reinforce his learning.
- B. Questions as an aid to the instructor.
 - 1. Serve as a participation technique.
 - 2. Act as a feedback mechanism.
 - 3. Are useful as a class control technique.

II. Uses of Questions

Discuss the timing and purposes of questions during the lesson presentations. Insure that the following points are identified and discussed:

- A. During the introduction to:
 - 1. Gain attention.
 - 2. Start the audience thinking.
 - 3. Orient on the subject.
- B. During the presentation to:
 - 1. Emphasize points.
 - 2. Gain participation.
 - 3. Acquire feedback.

- C. At the end of the presentation to:
 - 1. Obtain feedback.
 - 2. Clarify points not understood.
 - 3. Insure learner has achieved desired performance level.

III. Characteristics of Good Questions

- A. Specific as to requirement. (It has one specific purpose.)
- B. Discourages guessing.
- C. Is understood by the students.
- D. Is not multi-barrelled; emphasizes one point.
- E. Does not suggest the answer.
- F. Requires a definite answer.
- G. Encourages analysis and synthesis by learner.

IV. Proper Techniques for Answers

Point out that for the greatest learning benefit there are proper techniques for answering as well as for asking questions.

- A. In asking questions, emphasize that the question usually should be posed to the audience as a whole, there should be a pause until all have had a chance to think of the answer, and an individual should be called upon by name. Point out that a class roster should be available unless the instructor knows the members of the class or there are names on the desks. Discuss the effect on the class if the person is called on by name before the question is asked.
- B. Emphasize that when an instructor answers a question in class, he should insure that the whole class knows the question asked. If necessary, the instructor should repeat the question and perhaps rephrase the question if appropriate. Show how the instructor has several options at this point:

1. He may answer the question.
2. He may relay the question to another class member.
3. He may put the question back to the questioner.
4. If a class member answers a question, the instructor should insure that all have heard the reply. The instructor must insure that the answer given to the audience is correct and that the discussion is continued until the correct answer evolves and is so identified.
5. Some questions have several acceptable or "correct" answers.

V. Instructional Questioning Techniques

- A. Good questions and techniques are essential to good instruction.
- B. Questions gain attention, make the audience think, and highlight the main points.
- C. Questions benefit both student and instructor by providing feedback and participation.
- D. The proper technique is usually to pose the well developed question, pause, and then call on a student to answer.
- E. In answering questions from the class the instructor should insure that the class knows both question and answer.
- F. Questions strengthen learning in many ways but most importantly by increased learner participation.

BASIC INSTRUCTIONAL TECHNOLOGY

UNIT THREE

PROBLEM ANALYSIS - Unit Overview

Overview:

Effective training must be designed to address a specific, well-defined problem. This unit introduces workshop participants to a systematic approach to the analysis of personnel performance problems.

Options:

1. Speakers need only Lesson 1. Problem identification will already be accomplished for them. The speakers need to realize, however, that the objectives they will be teaching are not pulled out of a hat.
2. Professional trainers and superintendents need all three lessons.

Summary of Unit Activities

Lesson Title	Instructional Methods	Time	Support Materials
1. Introduction	Guided Discussion	15-30 Min.	Fig. 3.1
2. Definition of Problems	Lecture; Guided Discussion	20-40 Min.	Content Outline Fig. 3.2-3.4
3. Categories of Problems	Lecture; Guided Discussion	30-45 Min.	Content Outline Fig. 3.5-3.8 Assign. 3.1

UNIT THREE: PROBLEM ANALYSIS
LESSON 1 of 3: INTRODUCTION TO PROBLEM ANALYSIS

Estimated time:

15-30 minutes

Entering Competencies:

While no specific competencies are necessary to begin this lesson, the ability to explain the steps of the systematic design process is helpful.

Justification:

In order for trainers and superintendents to use problem analysis in their training planning, they first need to be convinced of the validity of the concept.

Objective:

Given typical problem situations, the participant will describe why problem analysis is an integral part of in-plant and classroom training for both continuing and prospective operators.

Evaluation Activities:

Participants' internalization of the objective will be demonstrated through responses during the guided discussion.

Resources:

Instructor:

-Fig. 3.1 - Define the Problem

Participants:

-None

Instructional Approach:

This lesson involves guided discussion. The objective will be successfully achieved when each participant realizes the importance of problem analysis to the planning of training activities.

1. Using Fig. 3.1, explain that this unit is concerned with the first step of the systematic approach to instruction. "Define the Problem."

2. Tell students that three major points will be discussed in Unit III: (1) The importance of problem analysis; (2) the definition of a problem; and (3) categories of problems.
3. Ask the participant to suggest why the ability to define problems is important for training performed on the job site.
4. Ask the participants to give examples of typical problems at a plant and have them relate these situations to why the ability to define problems at the work site is important when designing training programs for both continuing and prospective operators.
5. When the discussion is completed, ask if anyone does not agree with the concept of the importance of problem analysis. If anyone does, elicit examples from the other participants to reinforce the objective. (If the participant still is not convinced, invite him to discuss the matter further during a break.)

UNIT THREE: PROBLEMS ANALYSIS
LESSON 2 of 3: INTRODUCTION TO PROBLEM ANALYSIS

Estimated time:

20-40 minutes

Entering Competencies:

The importance of problem analysis must be internalized by the participants.

Justification:

The most important first step in attempting to solve a personnel performance problem is determining what the problem actually is. Instead of describing problems in this way, many people immediately begin to suggest solutions. This lesson shows the participants how to recognize the differences between problems, symptoms of problems and solutions.

Objective:

Given sample problem statements, participants will explain why each statement is adequate or inadequate.

Evaluation Activities:

Participants' understanding of the content of this lesson will be evaluated through their critique of sample problem statements in class.

Resources:

Instructor:

- Content Outline
- Fig. 3.2 - Problem #1
- 3.3 - Problem Definition
- 3.4 - Problem #2

Participants:

-None

Instructional Approach:

This lesson involves both lecture and guided discussion activities. Two major points are to be made: 1. most problems are incorrectly stated in terms of their causes or proposed solutions and 2. problems should be defined as discrepancies. An outline of the activities of this lesson includes:

1. Begin discussion of the problem statement using Fig. 3.2 and the Content Outline.
2. Introduce the concept of a problem defined as the discrepancy between the ideal situation and what is perceived to be the problem situation in Fig. 3.3.
3. Repeat the discussion with problem #2 in Fig. 3.4.
4. Continue the discussion with problem statements suggested by the workshop participants.

UNIT THREE: PROBLEM ANALYSIS
LESSON 2 of 3: INTRODUCTION TO PROBLEM ANALYSIS

Content Outline

I. Incorrectly Stated Problem #1

Introduce this lesson by stating that the first task to be accomplished is to analyze problem statements. Show Fig. 3.2 which states a problem.

"Our office needs an in-service program to retrain Wastewater Treatment Plant Operators."

Start a discussion by asking what the participants think of the problem. After two to four comments, stop the discussion and tell them the statement is not a problem. Explain that it is a proposed solution to some problem. From this statement we know only that someone thinks these operators need training. We do not know what problem or problems exist that lead them to think so. Plant operation procedures may have been changed, new equipment may have been installed, or perhaps some existing duties are not being performed to satisfaction. This "problem statement" does not give a clue as to where the real problem lies.

Using Fig. 3.3 explain that a problem might be better thought of as a discrepancy or deficiency between the way things are and the way things ought to be. Give some examples such as:

-Assembly line workers are taking 15 minutes to complete a task when they should be able to do it in 10.

-Donut makers are producing six dozen donuts per minute when they should be producing eight.

-Inspectors are reporting "x" and "y" situations as needing improvement when only "y" situations actually do.

Make the point that these examples are simply designed to clearly illustrate the point. Solicit examples from participants to illustrate discrepancy situations in work settings.

II. Incorrectly Stated Problem #2.

Show Fig. 3.4 and repeat the procedure followed for the first problem. This second problem is:

"Our employees do not care very much about the quality of their work."

In this case, point out that the fault with this statement is that it describes either a cause or a symptom of a problem. Guide the discussion so the participants understand that the problem might be low quality work. Or perhaps low quality work is a symptom of a larger problem. The major point to leave with them is that a problem must be considered very carefully before solutions are determined.

III. Participants' Problem Statements

To insure participant understanding of the nature of well-defined problems, have different people suggest personnel performance problems from their own experience. (You may want to write them on the board.) Then ask other participants to consider whether the problems have been properly stated.

UNIT THREE: PROBLEM ANALYSIS
LESSON 3 of 3: CATEGORIES OF PROBLEMS

Estimated time:

30-45 minutes

Entering Competencies:

Participants should be able to distinguish between correctly and incorrectly defined problems.

Justification:

Knowing the type of problem is essential to correctly determining what solution is most appropriate or effective. This lesson introduces the participants to the three types or categories into which personnel performance problems may be classified. It also stresses that training is often not suitable for motivational or environmental problems.

Objective:

Participants will identify a problem as representing one of three categories of problems. Given a sample problem, the participants will assign a problem to the: (1) skill or knowledge, (2) motivation or incentive, or (3) environmental problem categories.

Evaluation Activities:

Participants will check their own work on Assignment 3.1.

Resources:

Instructor:

- content Outline
- Fig. 3.5 - Categories of Problems
- 3.6 - Skill or Knowledge Problems
- 3.7 - Motivation or Incentive Problems
- 3.8 - Environmental Problems

Participants:

- Content Summary
- Assign. 3.1 - Categories of Problems

Instructional Approach:

This lesson consists of a lecture which defines and explains the three categories into which problems may be classified.

1. Begin the lecture by pointing out that not all problems are alike (i.e., different types of problems require different types of solutions). Present the categories using Fig. 3.5.
2. Show Fig. 3.6. Describe the kinds of problems which fall into this category and point out some indicators. Repeat this with the other categories using Fig. 3.7-3.8.
3. Ask the participants to complete the self check assignment in their manual on page 21. When all the participants have completed the assignment, entertain questions to clear up any confusion.
4. Explain that various forms are available to aid in the identification and categorization of problems. One such form will be used in the advanced course.

UNIT THREE: PROBLEM ANALYSIS
LESSON 3 of 3: CATEGORIES OF PROBLEMS

Content Outline

I. Categories

Begin by telling participants that not all personnel performance problems require training. There are many different kinds of problems. However, they can be classified into three general categories. (Fig. 3.5)

1. Lack of skills or knowledge
2. Lack of motivation or incentive
3. Environmental constraints

II. Skill or Knowledge Problems

Using Fig. 3.6, describe these problems as one in which people do not know what to do or how to do it. They may want to perform a task but they simply do not have the training for it. These are the problems for which training solutions are indicated.

III. Motivation or Incentive Problems

Using Fig. 3.7, define motivation problems as cases where, for some reason or reasons, people do not want to perform the task. They may know how to do it. In these cases, putting them through a training program will usually not solve the problem.

IV. Environmental Problems

Using Fig. 3.8, explain that environmental problems are typically cases in which the organization is hindering effective performance. These problems are not training problems. Many times they are management problems.

V. Discussion

Lead a discussion of categories of problems, asking for examples from participants' work situations. Concentrate on showing how motivation problems and environmental problems are not usually soluble through training.

BASIC INSTRUCTIONAL TECHNOLOGY

UNIT FOUR

TASK ANALYSIS - Unit Overview

Overview:

To design training relevant to a job-related problem, it is first necessary to identify all the component tasks of that job. This unit introduces the process of analyzing a job to define its tasks at various levels of detail. Workshop participants will learn to match the tasks to the appropriate type of learning required for their performance.

Options: .

1. Speakers need only complete Lesson 1. They should learn how the objectives from which they work were developed, but don't need to complete a task analysis.

Summary of Unit Activities

Lesson Title	Instructional Methods	Time	Support Materials
1. Introduction to Job Analysis	Guided Discussion; Assignment	30-45 Min.	Content Outline Fig. 4.1-4.5 Assign. 4.1
2. Types and Levels of Behavior	Lecture; Assignment	60-75 Min.	Content Outline Fig. 4.6-4.12 Assign. 4.2

UNIT FOUR: TASK ANALYSIS
LESSON 1 of 2: INTRODUCTION TO JOB ANALYSIS

Estimated time:

30-45 minutes

Entering Competencies:

None

Justification:

The participants must understand the relationship between a job and the tasks of which it is composed as the basis for planning training in that job.

Objective:

Given the concepts "job," "job description," "task analysis," the participant will give a description of each which paraphrase the definitions given in the lesson.

Evaluation Activities:

Each participant will complete a brief definition exercise which will be reviewed in class.

Resources:

Content Outline

-Fig. 4.1 - Analyze the Tasks

-4.2 - Job - Definition

-4.3 - Job Description - Definition

-4.4 - Task - Definition

-4.5 - Task Analysis - Definition

Participants:

Content Summary

-Assign. 4.1 - Definition Review

Instructional Approach:

This lesson introduces the concept that a job is composed of tasks or behaviors. It is through the specification of these tasks that effective training is developed. Your plan should be to present these concepts using an interactive (guided discussion) approach.

1. Using the content outline, introduce the unit and identify its location within the Instructional Design Model.
2. Define the terms: job description, task and task analysis using the content outline and accompanying figures. Elicit suggestions and examples from the participants both to involve them in contributing to the learning process and to insure the terms are understood.
3. Discuss the need for a task analysis as a prerequisite to the development of instruction.
4. Have participants complete Assignment 4.1, page 25 and discuss answers.

UNIT FOUR: TASK ANALYSIS
LESSON 1 of 2: INTRODUCTION TO JOB ANALYSIS

Content Outline

I. Introduction

Use Fig. 4.1 to explain that we have finished Step One and are now at the second step, Analyze the Tasks, of the Instructional Design Model.

II. Definition of Terms

Lead a guided discussion in which you first call upon the participants to explain what a job is. After the participants suggest a few definitions, present your own and also give your definition of a job description. (Use Fig. 4.2 and 4.3)

A. A job is the occupational title or position held by an employee.

B. A job description is a statement (or statements) outlining areas of responsibility (duties) of a given position.

Ask the participant to suggest several different job titles. Write "Collection Foreman" on the chalkboard and ask if that is an example of a job title. Then point out that we really know very little about what an employee actually does from a job description alone.

Continue the discussion by presenting the definitions of tasks and task analysis. (Use Fig. 4.4 and 4.5)

C. A task is one of the skills or operations which belong to a specific duty. Each task usually consists of specific and distinct steps for its completion.

D. Task analysis is the act of dividing a duty into all of its component tasks. It results in a list of everything an employee must do to advance the work to completion.

Using "Collection Crew Foreman," ask for examples of some of the duties that make up that job. (Under one duty, ask the students to list some of the tasks. Under one task, ask students to list the steps needed to accomplish the task. Try to lead the discussion to a fairly untechnical area so the participants don't get bogged down in technical details. The following is an example of the completed exercise, but the instructor should feel free to use a different job title or break down a different task to fit the backgrounds of the participants. .

Example:

Job Title: Collection Crew Foreman.

Duties: A. Repair lines.

- Tasks:** 1. Locate line.
2. Set up safety equipment.

- Steps:** a. Re-route traffic.
b. Position barricades.
c. Position flagmen.
d. etc.

3. Trench.
4. Shore, if necessary.
5. Determine Repair method.
6. etc.

- B. Lay new lines.
C. Clean lines.
D. etc.

C. Discuss the need for a task analysis in developing job training. Make sure the following points are raised in the discussion.

1. A job description is not specific enough to be used as the basis on which to teach that job.
2. It is essential to have a thoroughly defined and logically related set of actions to insure no details are forgotten and instruction for teaching the job is uniform.

III. Definition Review

Refer participants to the Assignment 4.1 in their manuals (pg. 25) and allow participants five minutes to complete it. Lead a summary discussion of these concepts by calling on participants to read and comment on the responses. As you see the group understands each concept, move on to the next. Limit the total time for this exercise to 15 minutes.

UNIT FOUR: TASK ANALYSIS
LESSON 2 of 2: TYPES AND LEVELS OF BEHAVIOR

Estimated time:

60-75 minutes

Entering Competencies:

Participants must be able to define job, job description, task, and task analysis.

Justification:

The different types and levels of behaviors must be understood prior to writing instructional objectives.

Objective:

The participants will match the different types and levels of behavior to specific tasks in Assign. 4.2.

Evaluation Activities:

Students will complete Assignment 4.2 and correct it in class.

Resources:

Instructor:

- Content Outline
- Fig. 4.6 - Affective Behavior
- 4.7 - Psychomotor Behavior
- 4.8 - Cognitive Behavior
- 4.9 - Cognitive: Knowledge
- 4.10 - Cognitive: Comprehension
- 4.11 - Cognitive: Application
- 4.12 - Cognitive: Problem-Solving
- Assign. 4.2 - Answer Key

Participants:

- Content Summary
- Assign. 4.2 - Types and Levels of Behavior

- Instructional Approach:**
1. Stress the importance of learning the different types and levels of behavior in the successful writing of instructional objectives.
 2. Present the Content Outline as a lecture.

3. Spend enough time giving examples of types and levels of behavior and having the students identify them that the students are comfortable with the concepts.
4. Have the students complete Assignment 4.2 in their manuals (pg. 27) and then correct them in class.
5. Explain that they will use the concepts learned in this unit throughout the remainder of the course. With use, the concepts will become clearer.

UNIT FOUR: TASK ANALYSIS
LESSON 2 of 2: TYPES AND LEVELS OF BEHAVIOR

Content Outline

I. Presentation of Types and Levels of Behavior

Introduce the participants to the concepts of types and levels of behavior. Explain it is necessary to understand these concepts in order to write effective instructional objectives.

A. Types of behavior.

Define and differentiate among the three general categories of behavior using Fig. 4.6 - 4.7.

1. Cognitive.

Actions which involve knowing, understanding or applying information; remembering or using facts or ideas.

2. Affective.

Expressions of feeling or interest; the adoption of an attitude or belief; the motivation to do something.

3. Psychomotor.

Physical action, speed or agility; the performance of a particular body movement.

It is likely that someone in the workshop will raise a question about a behavior or action which requires two or even all three types of behavior. Explain that many activities involve all three types of behavior to some degree. The task "check the filter" requires the employee know what should be done (cognitive), choose to do it (affective), and physically inspect the filter (psychomotor). However, in most training situations, it is readily apparent that one type of behavior is the major concern. In this example, the primary emphasis is on the cognitive behavior of knowing how to check the filter.

B. Levels of cognitive behavior.

Most training is concerned with cognitive behavior. However, not all cognitive behavior is alike. Introduce the participants to the four-level categorization of cognitive behavior using Fig. 4.9-4.12 to show simple examples. Once again, remind them they will learn about these levels in more detail in the next unit.

1. Knowledge.

Ability to state a fact, symbol, definition, procedure, etc.

2. Comprehension.

Understanding the meaning of a piece of information; ability to explain or classify.

3. Application.

Using knowledge and comprehension to complete some activity; use formula or rule, follow procedure.

4. Problem-solving.

Determining what must be done to perform some task. Create a procedure; combine rules or formulas into new rule.

II. Types and Levels of Behavior

Ask students to complete Assign. 4.2 in their manuals pg. 27. After they have completed the assignment, go over their answers in class, insuring the concepts are understood by all. This assignment serves as a review of Lesson 2.

UNIT FOUR: TASK ANALYSIS
LESSON 2 of 2: TYPES AND LEVELS OF BEHAVIOR

Answer Key - Assign. 4.2

1. The operator needs to be able to tighten a packing nut.
(psychomotor)
2. The operator needs to know the flow pattern through the plant.
(Cognitive: Knowledge)
3. The operator needs to know why the velocity through the grit chamber is 1 foot per second.
(Cognitive: Comprehension)
4. The operator needs to know that his job is important.
(Affective)
5. The operator needs to know when to increase the oxygen level in the trickling filter.
(Cognitive: Problem-Solving)

BASIC INSTRUCTIONAL TECHNOLOGY

UNIT FIVE

OBJECTIVE SPECIFICATION - Unit Overview

Overview:

A crucial step in a systematic planning of instruction is the specification of the behaviors or competencies expected of those who receive the instruction. A trainer must be able to answer the questions "How will I know a participant has learned the material?" or, "What can I expect of one who has completed the instruction?" This unit will teach participants how to write learning objectives in behavioral terms.

Options:

1. Speakers only need Lesson 1 out of this unit. They need to realize the importance of the objectives they are given to use. They also need to recognize poorly written objectives in order to request a revision of the objective if necessary.

Summary of Unit Activities

Lesson Title	Instructional Methods	Time	Support Materials
1. Introduction to Instructional Objectives	Guided Discussion; Lecture; Assignment	30-45 Min.	Content Outline Fig. 5.1-5.4 Assign. 5.1
2. Writing Instructional Objectives	Guided Discussion; Assignment	60-75 Min.	Content Outline Assign. 5.2
3. Levels of Objectives	Lecture; Assignment	75-90 Min.	Content Outline Assign. 5.3

UNIT FIVE: OBJECTIVES SPECIFICATION
LESSON 1 of 3: INTRODUCTION TO INSTRUCTIONAL OBJECTIVES

Estimated time:

30-45 minutes

Entering Competencies:

None is required. Familiarity with task analysis is helpful.

Justification:

Participants should be provided with explanatory information about the nature and use of objectives before learning how to write them.

Objective:

The participants will: (a) define the term "instructional objective," (b) describe why instructional objectives are important in the development of instruction, (c) identify examples of objectives stated in vague terms, and (d) list examples of objectives stated in explicit terms. The participants will attain at least a score of eight out of a possible ten points.

Evaluation Activities:

Participants will complete a short assignment which addresses the objectives listed above. The instructor will aid the students to correct and review, insuring that participants attain at least a score of eight out of a possible 10 points.

Resources:

Instructor:

- Content Outline
- Fig. 5.1 - Specify Instructional Objectives
 - 5.2 - Instructional Objectives: Definition
 - 5.3 - Vague Terms
 - 5.4 - Explicit Behaviors
- Assign. 5.1 - Answer Key

Participant:

- Content Outline
- Assign. 5-1 - Introduction Review

Instructional Approach:

This lesson is intended to answer three basic questions about instructional objectives:

1. What are they?
2. Why are they important?
3. How do they relate to a task analysis?

Use the content outline to answer these questions.

UNIT FIVE: OBJECTIVES SPECIFICATION

LESSON 1 of 3: INTRODUCTION TO INSTRUCTIONAL OBJECTIVES

Content Outline

I. Introduction

Introduce this unit by using Fig. 5.1 to show what steps of the instructional design process have been completed and where this unit fits in. Make sure that everyone has the same ideas about what an objective is and why it is important. Explain that any "speakers" in the group will be given objectives already written for them. They will need to be able to identify a "good" objective. The others in the group will need to write their own objectives.

II. Definition of an Instructional Objective

Using Fig. 5.2, define an Instructional Objective - A statement that describes an intended outcome of instruction. It describes a proposed change in a learner and it gives a description of a specific behavior or performance.

Spend a minute or two stressing the concept of behavioral outcome. Use questions like "How will you know a learner has learned?" or "What must a learner do to prove he knows the material?" Give several examples of measurable behaviors in order to reinforce the concept.

III. Importance of Objectives

Ask the students to give some reasons why objectives are important for someone who must plan or deliver instruction. After several reasons have been given, insure the following points have been covered:

- A. Objectives establish clear instructor and student goals.
- B. Objectives enable selection of the most appropriate lesson content for on-the-job training programs.

- C. Objectives permit selection of the most suitable instructional strategy.
- D. Objectives provide an objective basis for evaluating instruction.

IV. Poorly Defined Objectives

- A. Use vague or ambiguous words.
- B. Use verbs which are unmeasurable.
- C. Suggest performance which cannot be observed.
- D. Are unclear.

V. Vague vs. Explicit Behaviors

Using Fig. 5.3 and 5.4, show the difference between vague, unmeasurable terms and explicitly stated behaviors. Ask for additional examples.

A. Vague Terms include:

Know	Really Understand
Understand	Believe
Appreciate	Have Faith In
Enjoy	Fully Appreciate

B. Explicit Terms include:

Write	Compare
List	Contrast
Solve	Identify By
Construct	Underlining

VI. Explain Briefly that Objectives are Written from the Task Analysis Which has Already Been Completed

VII. Assignment

Direct students to turn to Assignment 5.1 in their manuals, pg. 30. The participants should complete the answers without the use of notes or other aids in 15 minutes or less. Have class members read their responses aloud and ask the students to correct and discuss any problems in their own papers.

UNIT FIVE: OBJECTIVES SPECIFICATION

LESSON 1 of 3: INTRODUCTION TO INSTRUCTIONAL OBJECTIVES

Assign. 5.1 - Answer Key

ANSWER KEY

1. Define the term "instructional objective."

(A statement which describes an intended outcome of instruction; it describes a proposed change in a learner and it gives a description of a specific behavior or performance.)

2. List four reasons why instructional objectives are important in the development of instruction.
 - a. Allow selection of appropriate lesson content for on-the-job training.
 - b. Allow selection of suitable instructional strategies.
 - c. Establish clear instructor and student goals.
 - d. Provide an objective basis for evaluating instruction.

UNIT FIVE: OBJECTIVES SPECIFICATION
LESSON 2 of 3: WRITING INSTRUCTIONAL OBJECTIVES

Estimated time:

60-75 minutes

Entering Competencies:

Participants beginning this lesson should be able to define the term "Instructional Objective" and distinguish between vague and specific behavioral terms.

Justification:

The ability to specify the behavioral outcomes of instruction is a key skill in planning and preparing educational lessons and materials.

Objective:

Participants will write complete instructional objectives according to the three part format using guidelines given by the instructor.

Evaluation Activities:

Participants will successfully complete Assignment 5.2.

Resources:

Instructor:
-Content Outline

Participants:
-Assign 5.2 - Writing Instructional Objectives

Instructional Approach:

Following the writing of an objective as a class, this lesson allows the participants to learn to write objectives at their own pace through the use of a self instructional reading. The reading, which is located in the Participant Reference Manual, pg. 31, includes:

1. Instruction on writing objectives according to a three part format.
2. A further explanation of the three domain classification scheme first mentioned in Unit Four.

UNIT FIVE: OBJECTIVES SPECIFICATION
LESSON 2 of 3: WRITING INSTRUCTIONAL OBJECTIVES

Content Outline

I. Writing an Objective in Class

Take one of the steps from the task analysis completed in class during Unit Four. For example, you might want to use "Position barricades prior to trenching." Write this step on a blackboard, overhead transparency, or flip chart. Explain that an objective will be written in order to teach this step.

Explain to the participants that each objective will be written in a three part format and each part is vital to a usable instructional objective.

List the three parts, briefly explaining each and giving examples.

1. Condition - what will the students have available while performing the behavior?
2. Behavior - what will the students do to show they have learned the information? Have the participants turn to pg. 36 in their manuals and explain that these lists are descriptive behaviors.
3. Acceptable performance - how well do students need to perform? What is the acceptable standard?

Then, working with the blackboard, flip chart or overhead, ask the students what condition, behavior, and acceptable performance they would use for your class example. When the objective is complete, indicate that the same considerations are used in writing all objectives.

Ask the class if they are comfortable with writing objectives or if they would like to do another one in class. Continue until the class feels satisfied.

II. Writing Instructional Objectives

Assign the participants to complete the self instructional Assignment 5.2, "Writing Instructional Objectives," which is located in their reference manuals (pg. 32). If you are giving this as a take-home assignment, stress that it must be completed before the next class session.

UNIT FIVE: OBJECTIVES SPECIFICATION
LESSON 3 of 3: LEVELS OF OBJECTIVES

Estimated time:

75-90 minutes

Entering Competencies:

Participants beginning this lesson should be able to write instructional objectives according to the three part format explained in Lesson 2.

Justification:

Participants must learn to write objectives at a performance level appropriate to the task.

Objective:

Participants will write instructional objectives of the same type and level as the task to be learned.

Evaluation Activities:

The instructor will review and critique the participants' work.

Resources:

Instructor:

-Content Outline

Participant:

-Assign. 5.3 - Types and Levels of Objectives

-Six Objectives Score Sheets (provided by the instructor)

Instructional Approach:

The participants complete a self instructional assignment on the three types of behavior (cognitive, affective, and psychomotor) and the four levels of cognitive behavior. The assignment directs them to practice writing objectives for each level. The participants write instructional objectives of the correct type and level and then break into small groups to discuss the quality of the objectives.

UNIT FIVE: OBJECTIVES SPECIFICATION
LESSON 3 of 3: LEVELS OF OBJECTIVES

Content Outline

I. Types and Levels of Objectives

Have the participants read and complete the exercises in the self instructional Assignment 5.3, "Types and Levels of Objectives," which is located in the Participant Reference manual, pg. 48.

II. Small Group Discussions

When all participants have completed the assignment, have them break into small groups of four to six. Each participant will read one instructional objective written as the final part of the assignment. The group, using the Objectives Score Sheets (Addendum C provided by instructor) will discuss the quality of the objectives. The instructor will circulate among the groups to answer questions and clarify any confusion.

UNIT SIX: EVALUATION TECHNIQUES
LESSON 1 of 1: THE NATURE OF EVALUATION

Estimated time:

60-90 minutes

Entering Competencies:

Participants should be able to construct instructional objectives in behavioral terms.

Justification:

The evaluation of trainee or employee skills, knowledge and job performance is an important part of training activities. Evaluation may be used to define the need for training, and support or assess the achievement of training objectives. This lesson introduces the use of evaluation and three specific evaluation techniques.

Objective:

Working with the information gained from the task analysis and instructional objectives completed in Units Four and Five, participants will define evaluation, plan the use of evaluation activities (written tests, checklists, rating scales) and offer explanations of their decisions.

Evaluation Activities:

The instructor will review the evaluation activities specified by the participants and insure their understanding from responses during the guided discussion.

Resources:

Instructor:

-Content Outline

-Fig. 6.1 - Evaluation

-6.2 - Compare Similar Things

-6.3 - Compare Against a Standard

-6.4 - Compare Before and After

-6.5 - Employee Capabilities

-6.6 - Feedback

-6.7 - Practice

-6.8 - Determine Preparation

-6.9 - Evaluations Differ

According to...

-6.10 - Example Check List

-6.11 - Example Rating Scale

Participants:

-Content Summary

-Assign. 6.1 - Evaluation Practice

Instructional Approach:

1. Using Fig. 6.1, begin the lesson by introducing the subject and showing where evaluation fits into the systematic approach.
2. The main substance of the lesson should then be presented in two stages as indicated on the content outline. Using Fig. 6.2-6.5, first define the nature and function of evaluation activities. (Work to remove any participant misunderstandings that training evaluation simply involves testing for grading.)
3. The second section of the presentation focuses on the uses of specific evaluation techniques: written tests, rating scales, and checklists. Use Fig. 6.6-6.11 to describe the nature and use of these techniques.
4. Assignment 6.1 should be completed by the participants and their responses discussed in small groups.

UNIT SIX: EVALUATION TECHNIQUES
LESSON 1 of 1: THE NATURE OF EVALUATION

Content Outline

I. Introduction

Using Fig. 6.1, introduce this unit by noting that evaluation is an important aspect of successful training programs. Explain that if the instructional objective has been written adequately, the evaluation type is generally predetermined. Use an example or two to reinforce this concept.

II. Definition of Evaluation

Definition: "Evaluation" can be defined in many different ways. Two useful definitions describe what it is and what it does.

A. Evaluation IS:

1. Evaluation can be defined as a systematic process for collecting, analyzing, and preparing information to provide a careful description of the subject of concern. This descriptive information can then be used to reach judgments regarding the present or future worth of that subject.
2. This definition of evaluation indicates that evaluation involves both description and judgment.
 - a. Description provides information - a portrayal of the quality, characteristics or nature of some activity, program, etc.
 - b. Judgment involves deciding upon the worth of one thing or activity relative to the worth of something else. It involves comparison.
 1. Comparison of one thing against similar things. (Example: comparing the performance of three new cars to decide which to buy.)
 2. Comparison of one thing against an absolute standard. (Example: judging cattle at the state fair on the extent to which each possesses certain ideal characteristics of weight, color, size, markings, etc.) (Use Fig. 6.3)

3. Comparison of one thing against itself at a different point in time. (Example: a farmer's judgment of the quality of his crops before and after the application of a pesticide.) (Use Fig. 6.4)

B. Evaluation DOES:

1. Evaluation can also be defined by what it does - the specific functions it fulfills. For training programs, evaluation may serve four functions.
 - a. Determine existing capabilities of employees as a basis for identifying necessary training programs. (Use Fig. 6.5)
 - b. Provide feedback to trainees during an instructional activity to let them know how they are progressing. (Use Fig. 6.6)
 - c. Provide opportunities for trainees to practice using a new skill. (Use Fig. 6.7)
 - d. Determine (or certify) the preparation of a trainee to do a particular job. (Use Fig. 6.8)

2. Examples

- a. Discuss examples of each of the four uses of evaluation activities in training settings.

Note how each of the four types of training evaluation differ according to who will use the information, what they want to know, why they want to know it, when they need to know it, and how certain they have to be about the accuracy of the results. (Use Fig. 6.9) As an example of these differences, note how the users of the evaluation information (the who) include the instructor, the trainee, the managers and others.

- b. Get participants to suggest a variety of different evaluation techniques that might be used in training settings. Ask them to think about all the different ways they as instructors might gather information about their trainees (e.g., evaluations of on-the-job performance, written tests, questionnaires, peer evaluations).

III. Written Tests, Rating Scales and Checklists

A. Specific Techniques.

Of the many different kinds of evaluation techniques, only a few of the most relevant ones for training purposes will be considered. Specifically:

1. Written tests - based on multiple choice, short answer, and essay items.
2. Checklists and rating scales.

B. Nature and use of written tests.

1. Nature.

a. Written tests - the familiar "classroom" test.

b. May be based on any of the following formats:

1. Essays.
2. Short answer (or "fill in the blanks").
3. Multiple choice.
4. True/false.

2. Uses.

a. Written tests are perhaps the most common form of instructional evaluation.

1. They are a useful means of evaluating cognitive skills such as:

- a. Knowledge.
- b. Comprehension.
- c. Application.
- d. Problem solving.

2. Written tests are also useful for providing:

- a. Quick feedback to the instructor or trainee.
- b. A precise, fairly impartial record of trainee performance.

3. Examples.

Have participants suggest examples of work related job performance skills that could be adequately evaluated through some form of written test. Have them also suggest examples of job performance skills that could not be adequately evaluated through written tests in the classroom. Discuss the differences. (One obvious difference would be when the performance of the job requires the correct manipulation of specialized kinds of equipment.)

C. Nature and use of rating scales and checklists.

1. Nature.

- a. Checklists: a list of skills or tasks which the trainee is expected to demonstrate in satisfactory performance of a job.

This is a very useful technique for evaluating a complex job when there is a specific series of steps to be completed. (Use Fig. 6.10)

- b. Rating Scale: a list of skills or tasks with each so carefully defined as to permit the evaluator to judge the relative quality of the performance. This technique is useful when there is a concern for grading or ranking the relative quality of a performance. (Use Fig. 6.11)

2. Use.

Checklists and rating scales are techniques for evaluating trainee (or employee) performance of a particular task, skill or procedure. They are particularly useful for evaluation of on-the-job performance. They enable the instructor and the trainee to see whether the "classroom learning" is correctly transferred to the real setting. They also enable the instructor to provide corrective feedback on task performance and/or certify trainee competence on a task.

3. Discussion.

Compare the example checklist and rating scale provided by Fig. 6.10 and 6.11. Discuss the differences in the use of these techniques and in the kind of information they would provide the evaluator. Discuss how the use of both of these techniques differs from written tests.

IV. Evaluation Planning Assignment

Using Assignment 6.1 and objectives specification exercises in the preceding unit, have participants decide on the appropriate evaluation activities (including, but not limited to, written tests, rating scales and checklists) for that particular training activity. Break participants into groups of 4-6 to discuss their evaluation plans. Make suggestions where appropriate. Indicate where this information will be recorded on the IPW.

BASIC INSTRUCTIONAL TECHNOLOGY

UNIT SEVEN

INSTRUCTIONAL METHODS - Unit Overview

Overview:

Effective instruction requires more than specifying objectives and listing content topics. Instructors must also select appropriate methods to deliver the content and make the most efficient use of available media. This unit introduces the basic knowledge and skills needed to design effective instruction.

Options:

1. Speakers need Lessons 1 and 2. They need to be assured this phase has been completed for them, but they will have flexibility to change the IPW's resource and instructional approach sections to more closely fit their own teaching styles and available resources.

Summary of Unit Activities

Lesson Title	Instructional Methods	Time	Support Materials
1. Introduction	Lecture	20-30 Min.	Content Outline Fig. 7.1-7.2
2. Four Types of Instructional Methods	Lecture; Guided Discussion	45-60 Min.	Content Outline Fig. 7.3-7.6
3. Selecting Instructional Methods	Lecture Demonstration	30-45 Min.	Content Outline Instructional Methods Sel. Table
4. Exercise in Selecting Methods	Individual Assignment; Guided Discussion	45-60 Min.	Assign. 7.1

UNIT SEVEN: INSTRUCTIONAL METHODS
LESSON 1 of 4: INTRODUCTION

Estimated time:

20-30 minutes

Entering Competencies:

Before beginning this lesson, participants should be familiar with the IPW.

Justification:

The selection of instructional methods is the logical result of the application of a series of steps that begins with problem analysis. Once participants know the procedure, they will be able to select effective, appropriate instructional methods efficiently.

Objective:

Participants, during a question-and-answer session, will describe activities by which appropriate instructional methods and sequences of methods are selected.

Evaluation Activities:

A question-and-answer session at the end of the presentation will serve as the evaluation activity for this lesson.

Resources:

Instructor:

-Content Outline

-Fig. 7.1 - Select Instructional Methods
and Media

-7.2 - Instructional Methods Definition

Participants:

-Content Summary

Instructional Approach:

This lesson consists of a lecture followed by a question-and-answer period. A content outline is provided; accompanying figures are keyed in the text.

1. Review the systematic approach to instruction, using Fig. 7.1.
2. Introduce the concept of "instructional method" using Fig. 7.2. Briefly describe the two activities involved: identifying available resources and selecting methods.
3. During the question-and-answer period, insure that participants understand in general the concepts just presented.

UNIT SEVEN: INSTRUCTIONAL METHODS
LESSON 1 of 4: INTRODUCTION

Content Outline

I. Instructional Decisions and the Systematic Approach

Review the systematic approach from Unit One, focusing on the nature of the instructional decisions within each phase. Emphasize the linear relationships among the phases and decisions. Use Fig. 7.1.

A. The systematic process.

1. Phase One: Analysis.

- a. Define the problem.
- b. Analyze the tasks.

2. Phase Two: Design.

- a. Specify instructional objectives.
- b. Determine evaluation activities.

3. Phase Three: Development.

- a. Select instructional methods.

II. The Development Phase

During this period, insure that the participants realize the resources and instructional approach portions of the IPW will be filled out with information learned in this unit, along with information from the next unit.

Define "Instructional Method." Indicate that the instructor has determined what must be taught (instructional objectives); now he must decide how the content should be taught (instructional methods). Emphasize the importance of considering both the activities the instructor engages in and the activities the trainees engage in during learning. Discuss the need to select methods that are appropriate for both the objective and the available resources. Use Fig. 7.2

A. The nature of development.

1. Selection of means and ways of facilitating learning.
2. Learning activities and instructional activities.
 - a. Learning activity: something a learner does to help learn. (e.g., watches a demonstration, reads a manual)
 - b. Instructional activity: something an instructor does to help trainees learn. (e.g., gives a lecture, assigns problems to be solved)
3. Instructional methods are ways of providing instructional activities and learning activities.

B. Components of the development phase.

1. Identify and classify available resources.
2. Select instructional methods that are consistent with the types of available resources and with the type and level of desired behavior.

C. Result of the development phase.

1. A set of instructional methods which lead trainees toward mastery of objectives.
2. A list of resources that are available for use during instruction.

UNIT SEVEN: INSTRUCTIONAL METHODS
LESSON 2 of 4: FOUR TYPES OF INSTRUCTIONAL METHODS

Estimated time:

45-60 minutes

Entering Competencies:

Before beginning this unit, participants should have completed Unit Seven, Lesson 1.

Justification:

Instructional methods have different degrees of effectiveness in different instructional environments. An understanding of the strengths and weaknesses of each method is important for trainers.

Objective:

During guided discussion, participants will describe four types of instructional methods and list advantages and disadvantages of employing each method.

Evaluation Activities:

Participant discussion will serve as the evaluation activity for this lesson.

Resources:

Instructor:

- Content Outline
- Fig. 7.3 - Lecture
 - 7.4 - Demonstration
 - 7.5 - Guided Discussion
 - 7.6 - Individualized Instruction

Participants:

- Content Summary

Instructional Approach:

This lesson contains two activities, a lecture on types of instructional methods and a discussion of the usefulness of each method in different instructional situations. Figures accompany the presentation. Their use is keyed in the Content Outline.

1. Review briefly the definition of "instructional method."
2. Present each type of method, using the Content Outline and Fig. 7.3-7.6. Pause after each method for questions and comments.
3. Compare and contrast the four methods in terms of the appropriateness of each for different instructional situations. Refer participants to the Content Summary in their manuals, pg. 66.
4. Lead a brief discussion of the relative usefulness of each method for participants' own training situations.

UNIT SEVEN: INSTRUCTIONAL METHODS
LESSON 2 of 4: FOUR TYPES OF INSTRUCTIONAL METHODS

Content Outline

I. Four Types of Instructional Methods

Present the four types of methods using Fig. 7.3-7.6. Emphasize the strengths of each type in terms of the appropriateness of each for specific instructional situations, using the content outline below.

A. Four types of methods.

The four methods represent the four possible types of communication between instructors and learners.

1. Lecture - communication of verbal information from instructor to learners.
2. Demonstration - communication of verbal information and visual display of skills from instructor to learner, including practice.
3. Guided Discussion - sharing of communication among instructor and learners.
4. Individualized Instruction - individual reception of communication from printed materials or from a tutor.

Refer the participants to the section of the Content Outline entitled "Four Types of Instructional Methods" in their reference manuals (pg. 68) and explain each.

B. The lecture (method #1).

1. Definition: Uninterrupted speech by which one presents information to others.
2. Characteristics of a good lecture.
 - a. The lecturer has good public speaking skills.

b. The presentation is:

1. Brief - usually no more than 15-20 minutes of uninterrupted speech; a lecture should not strain normal attention span.

2. Organized - a chart of organization follows:

-Introduction - establishes rapport between lecturer and learners; defines the purpose of the lecture, gains learners' attention, and motivates them to remain attentive; outlines the major points of the lecture; and defines the objectives of the lecture.

-The Body - uses a simple-to-complex structure for presenting the content; aims toward specific objectives; provides opportunities for questioning; and allows for practice of knowledge.

-The Conclusion - reviews and summarizes main points; opens opportunity for student responses; and provides directions to the next activity.

3. Accompanied by media (when appropriate). Media includes:

-Highlighting - visual accompaniments such as outlines, graphics, pictures - reinforce content during the lecture.

-Student Handouts - "take-homes" such as outlines, procedural guidelines, etc. -serve as a personal employee manual for on-the-job use.

3. Advantages.

- a. Presents large amounts of information from many or from hard-to-get sources in short amount of time.
- b. Gives instructor control over the kind of information and organization presented.
- c. Provides the most efficient way to introduce and to summarize a learning experience.

4. Disadvantages.

- a. Over-stresses acquisition of facts.
- b. Can make learners into passive, dependent receivers of information.
- c. Is instructor-paced.
- d. Often exceeds the learners' attention or interest span.
- e. Is often over-used or misused.
- f. Depends for success on instructor's oral presentation ability.

C. Demonstration (method #2).

- 1. Definition: Showing, as opposed to telling, how to do something by manipulating appropriate materials and equipment.
- 2. Characteristics of a good demonstration.
 - a. The instructor prepares the site and materials.
 - 1. On-location or simulated site is chosen and prepared for maximum effectiveness and visibility to all learners.
 - 2. Materials and equipment obtained and tested by working through demonstration.
 - 3. Setup should allow everyone to see demonstration.
 - 4. Media/handouts prepared to complement demonstration. (i.e., steps outlined, decision points and criteria defined, "success" described in terms of predefined criteria.)

- b. The instructor prepares for the students.
 - 1. Necessary orientation information developed.
 - 2. Mini-lectures for introducing and summarizing the procedure prepared.
 - 3. Frequent opportunities provided to ask questions.
 - 4. Frequent checks to insure student understanding.
 - 5. Opportunities to practice the procedure.
- c. Instructor follows up.
 - 1. Reviews and evaluates student practice sessions.
 - 2. Reviews the procedure in other teaching situations.
- 3. Advantages.
 - a. Gives hands-on experience.
 - b. Allows learners to develop and practice skills under supervision.
- 4. Disadvantages.
 - a. Not useful alone; must be prepared for and summarized through lecture or reading.
 - b. Large groups of learners require much time for practice in order to be effective.
 - c. Useful only for fixed-step procedures, not for creative problem solving.
 - d. Requires equipment, materials, and often, site visits.
 - e. Sometimes limited to a smaller group of learners so all can see the process and procedure.
 - f. Some danger (fumes, explosions, burns, mechanical injuries, etc.)

D. Guided discussion (method #3).

1. Definition: A structured sharing of ideas and opinions in order to arrive at a mutually acceptable decision or solution to a problem.
2. Characteristics of a good discussion.
 - a. Not a bull session - topics and objectives must be carefully prepared and purpose explicitly defined so group will know when discussion should end.
 - b. Groups should be small enough to allow everyone to participate and large enough to avoid polarization or domination by a few.
 - c. Discussion leader:
 1. Initiates discussion by stating topics, objectives, and guidelines (rules for participating, parameters of discussion).
 2. Coordinates discussion by summarizing ideas and establishing relationships among ideas.
 3. Orients discussion by pulling discussion back to topic; avoids playing expert and giving lectures.
 4. Encourages participation by warmth, non-critical analysis of contributions, questioning silent members in non-threatening way.
 5. Harmonizes the group by dealing with personal confrontations and disagreements and arbitrating as necessary.
 6. Monitors by preventing anyone from dominating the group.
 - d. Physical environment is arranged to facilitate discussion by insuring eye contact among all participants.

3. Advantages.

- a. Allows all members of group opportunity to share ideas.
- b. Provides for mutual solving of a problem and practice in ways of solving problems.

4. Disadvantages.

- a. Can be dominated by an individual or faction.
- b. Can degenerate into an exchange of abuse.
- c. Can bog down in extended, uncomfortable silence or irrelevancies.
- d. Can degenerate into leader-provided lectures.
- e. Can be misused (not suitable for communicating factual information or teaching procedures).

E. Individualized instruction (method #4).

1. Definition: To adapt instruction to individual needs, goals, learning materials and/or instructional methods, and techniques chosen specifically to suit a particular student or group of students.

Types of individualized instruction: Individualized learning packages, assignments, computer assisted instruction (CAI) and tutoring.

2. Characteristics of good individualized instruction.

- a. Characteristics of effective individualized learning packages include:
 - 1. Provides all the information and materials learner needs to know on learner's own.
 - 2. Provides for practice and feedback.
 - 3. Is structured properly (orienting overview, body with logical learning steps, summarizing review).
 - 4. Meets individual needs of learners in terms of pacing, level of sophistication, and learning style.

b. Characteristics of effective assignments include:

1. Application oriented - allows students to apply knowledge and skills in new or unfamiliar contexts.
2. Allows for choice - provides options so the students can choose among alternative assignments, contexts, or subjects.
3. Builds skills in specific steps from simplest to most complex.

c. Characteristics of effective computer assisted instruction (CAI) include:

1. Simple mechanical manipulation that does not interfere with the learning process.
2. Fulfills characteristics of non computer individualized learning packages or tutoring, depending on what the objective of the CAI is.

d. Characteristics of effective tutoring include:

1. Is a one-to-one session between tutor and learner (tutor need not be the instructor; could be a peer.)
2. Has problem-solving orientation using stages of diagnosis and remedy.
3. Builds skills in specific steps.
4. Tutor guides learner to discover answers - does not lecture at learner.
5. Session is problem-specific and ends when solution is discovered.

3. Advantages.

- a. Responsive to individual needs.
- b. Allows for learner pacing and repetition as desired.

- c. Individualized learning packages can be given out when it is difficult to organize a class or too few students or no instructor is available.
- d. Tutors can be used to help several learners with difficult problems in a short space of time.
- e. Computer assisted instruction can be utilized in any situation where the machine is available (whether designed for CAI, used during business hours for other computer functions or privately owned).

4. Disadvantages.

- a. Instructor-made individualized learning packages are expensive to prepare.
- b. May not be suitable for complex or complicated subject matter.
- c. Not useful for teaching procedures that require equipment or complicated materials.
- d. Does not allow for exchange of ideas and opinions - basically a lonely method of learning.

II. Usefulness of Each Method for Training

Conduct a discussion of the relative usefulness of each method for the participants' own training situations.

UNIT SEVEN: INSTRUCTIONAL METHODS
LESSON 3 of 4: SELECTING INSTRUCTIONAL METHODS

Estimated time:

30-45 minutes

Entering Competencies:

Before beginning this lesson, participants should be able to describe four types of instructional methods.

Justification:

Instructional methods must be directly derived from considerations about types and levels of behavior specified in objectives and the types of resources available for instructional use. The personal preference of the instructor is less important than considerations of objectives and resources.

Objective:

Participants will describe from memory the Instructional Methods Selection Table, describe the table in terms of the categories presented and in which ways these categories have different applicability to each type and level of behavior, and explain how the information obtained from this table can directly inform decisions on the Instructional Approach section of the IPW.

Evaluation Activities:

Application exercise in Lesson 4 will serve as the evaluation activity for this lesson.

Resources:

Instructor:

- Content Outline
- Instructional Methods Selection Table

Participants:

- Content Summary
- Instructional Methods Selection Table

Instructional Approach:

This lesson consists of a demonstration of the procedure for selecting instructional methods and a discussion of the use of the Instructional Methods Selection Table.

1. Demonstrate the use of the Instructional Methods Selection Table. Table is in the Participant Reference Manual (pg. 78).
2. Discuss problems and concerns in using the table to select methods.

UNIT SEVEN: INSTRUCTIONAL METHODS
LESSON 3 of 4: SELECTING INSTRUCTIONAL METHODS

Content Outline

I. Selecting Instructional Methods

A. In order to select a method or sequence of methods, the instructor must:

1. Identify the type and level of behavior specified in the objective.
2. Use the level and type of behavior to select a method from the Instructional Methods Selection Table.

B. Considerations in selecting methods.

1. Most instruction consists of a sequence of methods, each of which may have a relatively short duration. The sequence, which is designed to teach a single objective, constitutes a single lesson.
2. Trainees need opportunities to practice what they are learning. Application assignments, therefore, must form a large and significant part of successful instruction. Thus, most method sequences include frequent practice assignments and exercises, either in class or take-home.
3. When more than one instructional method appears appropriate for a given instructional situation, the most efficient method in terms of preparation time, number of resources needed, and class size should be chosen.

C. Using the instructional methods selection table.

Demonstrate the use of the Instructional Methods Selection Table (in the Participant Reference Manual pg. 78). Enter the table by finding the row which represents the type and level of behavior of the objective to be achieved by the instruction. Use the information provided in the table to select the method or methods which are appropriate for the behavior to be learned.

INSTRUCTIONAL METHODS SELECTION TABLE

Instructional Method

Types of Behavior	I	I	I	I	I	I
	Lecture	Demonstration	Guided Discussion	Individual Instruction		
Cognitive: Knowledge	A	P	P	A		
Cognitive: Comprehension	A	A	P	A		
Cognitive: Application	A	M	P	A		
Cognitive: Problem Solving	P	A	A	A		
Psychomotor	A Demon.	M	P	A Demon.		
Affective	P	A	A	P		

Legend: A = Appropriate and useful
M = Most appropriate
P = Not generally useful

UNIT SEVEN: INSTRUCTIONAL METHODS
LESSON 4 of 4: EXERCISE IN SELECTING METHODS

Estimated time:

45-60 minutes

Entering Competencies:

Before beginning this lesson, participants should be able to describe the characteristics, advantages, and disadvantages of the four instructional methods: lecture, demonstration, guided discussion and individualized instruction.

Justification:

The learning of new skills is most efficiently accomplished through supervised practice. This exercise provides an opportunity for participants to gain practice in using objectives and the Selection Table and makes more visible and clear to participants the linear relationships among the steps of task analysis, objectives specification, resource identification, and method selection.

Objective:

Given a specified objective with type and level of behavior identified, participants will identify appropriate instructional methods using the Instructional Methods Selection Table provided.

Evaluation Activities:

Successful mastery of this objective will be demonstrated through the application exercise during which participants will select instructional methods that are consistent with type and level of behavior.

Resources:

Instructor:

-None

Participant:

-Assign. 7.1 - Selecting Instructional Methods

Instructional Approach:

This lesson consists of an assignment in which participants will practice applying skills and knowledge developed through earlier lessons. The exercise involves completing an IPW from a prepared Task Detailing Sheet.

1. Refer participants to Assign. 7.1, Selecting Instructional Methods, in the Participant Reference Manual page 79. Review the directions with participants. Instruct them to complete the IPW for a single Task Step on the Task Detailing Sheet. Inform them they will have 45 minutes to complete the assignment. Remain available to provide guidance but give as little direct aid as possible.
2. After 45 minutes, conduct a discussion of the participants' work and answer any questions they may have.

BASIC INSTRUCTIONAL TECHNOLOGY

UNIT EIGHT

INSTRUCTIONAL MEDIA AND RELATED RESOURCES - Unit Overview

Overview:

Media has become an integral part of modern instruction. Through EPA's Instructional Resources Information System (IRIS), a variety of visual materials are available relevant to environmental quality control subjects. This unit is designed to provide the basic information and skills needed to select and employ media in support of effective instruction. Among the topics to be covered are the reasons for using media, a description of the various types of instructional aids available, an exercise in choosing media, a description of some of the sources of media, and the principles of appropriate media use.

Options:

1. Speakers need all but Lesson 3

Summary of Unit Activities

Lesson Title	Instructional Methods	Time	Support Materials
1. Reasons for Use of Training Aids	Lecture; Guided Discussion; Assignment	15-30 Min.	Content Outline Assign. 8.1 Ans. Key
2. Introduction to types of Training Aids	Lecture; Guided Discussion; Assignment	45-50 Min.	Content Outline Fig. 8.1 Assign. 8.2
3. Selecting Educational Media for Instruction	Assignment; Guided Discussion	60-75 Min.	Media Sel. Table Assign. 8.3 Ans. Key

4. Sources of Training Materials	Lecture; Guided Discussion	45-60 Min.	Content Outline Fig. 8.2-8.4 Sample IRIS Abstracts
5. Using Training Aids	Lecture; Assignment	45-60 Min.	Content Outline Programmed Notes 3 x 5 Cards

UNIT EIGHT: INSTRUCTIONAL MEDIA AND RELATED RESOURCES
LESSON 1 of 5: REASONS FOR THE USE OF TRAINING AIDS

Estimated time:

15-30 minutes

Entering Competencies:

There are no specific prerequisites for beginning this lesson.

Justification:

Media use is highly recognized as a means of improving the training experience. Therefore each instructor should have a basic understanding of why media can improve student performance.

Objective:

Given Assignment 8.1, participants will recall the two rules of using media, describe the importance of the split hemisphere theory in teaching and recall the retention level effectiveness under various conditions.

Evaluation Activities:

This lesson includes an assignment which must be completed satisfactorily.

Resources:

Instructor:

-Content Outline.

-Assign. 8.1 - Answer Key

Participants:

-Content Outline

-Assign. 8.1 - Media

Instructional Approach:

This lesson constitutes the introduction and orientation to Unit Eight - Instructional Media and Related Resources. You will accomplish two purposes during your lecture: 1. identifying two rules for the use of media and 2. identifying the major reason that media helps to improve classroom instruction.

1. Begin your presentation with a discussion of the importance of learning about several types of media.
2. Describe the structure of the unit, identify lesson titles within the structure portrayed in the Summary of Unit Activities.
3. Discuss the two rules for the use of media.
4. Using a blackboard sketch of the two hemispheres of the human brain, describe the split hemisphere theory and how our understanding of that theory increases our understanding of the effect of visual aids on the learning process.
5. Have students complete Assignment 8.1 - Exercise in their manuals, pg. 87, and discuss their answers in a guided discussion.

UNIT EIGHT: INSTRUCTIONAL MEDIA AND RELATED RESOURCES
LESSON 1 of 5: REASONS FOR THE USE OF TRAINING AIDS

Content Outline

I. Introduction

A. Media use for focusing on objective.

Rule One: The media should always focus on one or more objectives.

B. Review domains of learning.

1. Cognitive.

2. Affective.

3. Psychomotor.

C. Using the information to reinforce learning.

Rule Two: Always have the student do something with the information from the media after the media has been presented.

II. Effects of Media

A. Retention.

1. 10 percent - reading.

2. 20 percent - hearing.

3. 30 percent - seeing.

4. 50 percent - seeing and hearing.

5. 70 percent - saying.

6. 90 percent - seeing and doing.

B. Split hemisphere learning.

1. Sides of brain control opposite sides of body.
2. Sides of brain record different types of information.
 - a. Left side - linear functions, logic, time, reasoning, language, writing.
 - b. Right side - space, movement, emotion, facial recognition, music, depth perception.
3. It is the combination of the effects of both sides that allows us to think and react to information.
4. Retention of information is improved from visualizing what is said because the information is stored in both sides of the brain making retrieval much better.

III. Assignment

Have participants turn to page 87 in the Participant Reference Manual and complete Assignment 8.1 - Exercise.

UNIT EIGHT: INSTRUCTIONAL MEDIA AND RELATED RESOURCES
LESSON 1 of 5: REASONS FOR THE USE OF TRAINING AIDS

Assignment 8.1 - Answer Key

1. Focus, objectives.
2. Do something.
3. Reading, seeing and doing.
4. Left.
5. Right.
6. Basically the impact of speaking or writing material and at the same time visualizing the concept enhances the learning level.

UNIT EIGHT: INSTRUCTIONAL MEDIA AND RELATED RESOURCES
LESSON 2 of 5: INTRODUCTION TO TYPES OF TRAINING AIDS

Estimated time:

45-50 minutes

Entering Competencies:

There are no specific prerequisites for beginning this lesson.

Justification:

When selecting media for use in instruction most people think only of slides or films. Furthermore, many trainers do not consciously think of each medium as having specific characteristics which make it particularly suited to some kinds of instruction and not appropriate for others. This lesson presents a list of a number of usable media and provides a scheme for classifying them according to shared characteristics.

Objective:

Participants will list appropriate media for use in teaching three objectives.

Evaluation Activities:

This lesson includes an assignment on media categories and specific training aids which will be corrected in small group discussions.

Resources:

Instructor:

-Content Outline

-Fig. 8.1 - Medium of Instruction:
Definitions

Participants:

-Content Summary

-Assign. 8.2 - Media Choice

Instructional Approach:

The instructor's activities for this lesson consist of defining media, presenting types of training aids in six categories, and leading a discussion on:

1. What media belong in these categories.
2. What makes the categories different.
3. For what types of instruction each category is most suited.
4. The advantages and disadvantages of each.

Conclude this lesson by having participants complete Assignment 8.2 in the manuals, pg. 97, and then break into small groups to discuss their responses.

UNIT EIGHT: INSTRUCTIONAL MEDIA AND RELATED RESOURCES
LESSON 2 of 5: INTRODUCTION TO TYPES OF TRAINING AIDS

Content Outline

I. Definition of Medium

Use Fig. 8.1 to define these terms.

Medium of instruction - a channel of communication through which instruction is presented to the learner.

Explain that "media" means all the ways in which instruction can be conveyed to the learner. If the participants immediately think of film or television when they hear the word "media" it is because that is the most common context in which the term is used.

II. Discussion of Categories of Media

Use a chalkboard or flip chart to present the list of media categories.

A. Categories of media.

1. Tangible aids.
2. Still pictures.
3. Moving pictures.
4. Audio media.
5. Written materials.

Use a chalkboard or flip chart to lead a discussion of the media which belong in these categories (listed below).

Then discuss how the differences among these categories suggest that they are suitable for teaching different types and levels of behavior. The explanations of specific types of media or training aids (i.e., objects) is included to assist you in this discussion. the explanations are not designed to be presented in full.

B. Media by category.

1. Tangible aids: (Valuable for cognitive or psychomotor behaviors but only games and role playing are appropriate for the affective domain.)

- a. Objects - provide an opportunity to see, feel, manipulate and use the actual objects connected with the specified objective.

- 1. Advantages.

- a. See the real thing.
 - b. Takes learning from theoretical to practical level.

- 2. Disadvantages.

- a. Requires considerable preplanning.
 - b. Acquisition.
 - c. Storage.
 - d. Transportation.

- b. People - useful aids for instruction, especially in the psychomotor area.

- 1. Advantages.

- a. Can provide information otherwise unavailable to the instructor.
 - b. Reinforces theoretical learning with statements of practical use.

- 2. Disadvantages.

- a. Cost.
 - b. Time coordination.
 - c. Coordination with objective.

- c. Models - may be appropriate when objects under discussion are not readily accessible or are too big, small, complex or expensive.

- 1. Advantages.

- a. Makes learning three dimensional.
 - b. Gives hands on experience.

- 2. Disadvantages.

- a. May be expensive.
 - b. Availability.
 - c. Storage.

d. Games and gimmicks - ice breakers, closing exercises, problem solvers.

1. Advantages.

- a. Allow enjoyable learning.
- b. Reinforces concepts.
- c. Helps students to relate to each other and instructor.

2. Disadvantages.

- a. Time consuming.
- b. Availability.
- c. May diverge from objective.

e. Simulations and role playing - useful in clarifying complex topics and involving participants in the learning process.

1. Advantages.

Same as games and gimmicks.

2. Disadvantages.

Same as games and gimmicks.

f. Computers - computer assisted instruction (CAI) is the newest form of teaching tool; preprogrammed instruction is available in many subjects; particularly valuable for drill practice.

1. Advantages.

- a. Student paced.
- b. Trend for future.
- c. Excellent for drill on basic principles.

2. Disadvantages.

- a. Expensive unless being used on site for other purposes.
- b. Programs not readily available in environmental subjects.
- c. Require limited computer competence.

2. Still pictures. (Only valuable for teaching cognitive skills).
 - a. Photographs - especially useful for individual study.
 1. Advantages.
 - a. Allows individual study.
 - b. Good quality available.
 - c. Easy to produce locally.
 2. Disadvantages.
 - a. Poor for large group discussion.
 - b. Cost.
 - c. Storage.
 - b. 35mm color slides - may be used to project a high quality picture for group use. Also, individuals may use a hand viewer.
 1. Advantages.
 - a. Locally produced.
 - b. Showing order easily changed.
 - c. Easily stored.
 - d. Used in any sized group.
 2. Disadvantages.
 - a. Quality photography required.
 - b. Special lighting required.
 - c. Filmstrips - present a series of slides in a fixed sequence.
 1. Advantages.
 - a. Quality finished appearance.
 - b. Duplicatable presentation.
 2. Disadvantages.
 - a. Cost.
 - b. Requires special equipment.
 - c. Availability.

d. Overhead transparencies - can project written material, artwork or a photograph with black lines or in color; can be "created" during the instruction.

1. Advantages.

- a. Leave room lights on.
- b. Easily produced.
- c. Quickly produced.
- d. Instructor controls classroom.
- e. Additions can be made to presentation.
- f. Permanent record.

2. Disadvantages.

- a. Instructor can become too dependent on overhead.
- b. Rarely well produced.

e. Chalkboard - flexible and inexpensive way to present written material and simple illustrations.

1. Advantages.

- a. Don't require artist.
- b. Spontaneous; flexible.
- c. Allows student to follow development.
- d. Lights kept on.

2. Disadvantages.

- a. Not easily repeatable.
- b. No permanent record.
- c. Restricted to smaller groups.
- d. Messy.

f. Charts and posters - for simple instruction, reminders, or to gain attention. Flip charts may be especially useful for on-the-job training.

1. Advantages.

Same as blackboard.

2. Disadvantages.

- a. Similar to blackboard disadvantages.
- b. Storage.

3. Moving pictures. (Useful for teaching all three types of behaviors.)

- a. Commercially produced 16mm film - a highly attractive and attention-compelling medium, may be used to show motion, illustrate actual events and dramatically re-enact stories and events.

- 1. Advantages.

- a. High quality.
- b. Show motion.
- c. Adds realism.
- d. Duplicatable.

- 2. Disadvantages.

- a. Cost.
- b. Availability.
- c. Lighting.
- d. Equipment.
- e. Difficult to stop for discussion of important points.

- b. Single concept 8mm loop film - provide demonstrations of single skills, processes, events or ideas; are usually silent.

- 1. Advantages.

- a. Similar to commercial films.
- b. May be locally produced.
- c. Specific to objective.

- 2. Disadvantages.

Similar to commercial films.

- c. Locally produced film - offer many of the advantages of the films described above with the additional capability of presenting instruction tailored directly to instructional needs.

- 1. Advantages.

Same as film loops.

- 2. Disadvantages.

Same as film loops.

d. Instructional television - commercial broadcasts and professionally produced tapes are similar to commercially produced film; they can present more current events as well.

1. Advantages.

- a. Usually highly polished and professional.
- b. Inexpensive after initial installation.
- c. Recognizable by student.

2. Disadvantages.

- a. Must be viewed when scheduled.
- b. Not repeatable.
- c. No record.

e. Video tape - video tape units can be used to record events or psychomotor behaviors and replay them immediately for instructional feedback.

1. Advantages.

- a. Very flexible.
- b. Visual.
- c. Advantages of slides and movies.

2. Disadvantages.

- a. Expensive.
- b. Not readily available yet.
- c. Often misused.

4. Audio media. (Useful only for cognitive behaviors.)

a. Professionally produced audio materials - present professional musicians, poets, historians and other national or international figures for individual or group use.

1. Advantages.

- a. Allows presentation of sound information.
- b. Inexpensive.
- c. Readily available.

2. Disadvantages.

Similar to those of instructor/student exchanges.

- b. Locally produced audio materials - can present special instructions, guest presentations and student presentations; are flexible and inexpensive to use.

1. Advantages.

Similar to above.

2. Disadvantages.

Similar to above.

5. Written Materials. (Very useable for teaching cognitive skills but limited usefulness for affective or psychomotor skills).

- a. Text and reference books - present detailed information which is easily accessible and can be studied at an individual's own pace.

1. Advantages.

- a. Permanent record.
- b. Readily available.
- c. Relatively inexpensive.
- d. May be referred to after instruction is completed.

2. Disadvantages.

- a. Requires basic reading ability and comprehension.
- b. Time consuming.
- c. Retention short.

- b. Workbooks - allow for practice of procedures and other learning events where learners can respond in writing to presented problems and often receive direct feedback immediately.

1. Advantages.

- a. Similar to books.
- b. Provide practice.

2. Disadvantages.

Similar to books.

c. Periodicals - are especially useful for presenting current information.

1. Advantages.

- a. Similar to books.
- b. More timely than books.

2. Disadvantages.

Similar to books.

d. Teacher produced handouts - useful for supplying specific instructions on instructional activities and supplemented information; are also used to evaluate learning.

1. Advantages.

- a. Similar to books.
- b. Supplement readily available materials.
- c. Specific.

2. Disadvantages.

- a. Similar to books.
- b. Easily misplaced.

e. Programmed notes - vital to allow students to devote their full attention to a source of information rather than having to concentrate on taking notes.

1. Advantages.

- a. Similar to books.
- b. Participatory.

2. Disadvantages.

Similar to handouts.

III. Media Assignment

Direct students to Assign. 8.2 in the Participant Reference Manual (pg. 97) and assign the participants fifteen minutes to complete it. (Answers will vary, so no key is provided. Have students break into small groups to discuss their assignments.)

UNIT EIGHT: SELECTING MEDIA FOR INSTRUCTION
LESSON 3 of 5: SELECTING EDUCATIONAL MEDIA FOR INSTRUCTION

Estimated time:

60-75 minutes

Entering Competencies:

Participants beginning this lesson must be able to list and describe the six categories presented in Lesson 2 and list several media which belong in each category.

Justification:

Trainers who must plan instruction should have a basis for making decisions as to which media may be most appropriate for specific instructional objectives. While there are no scientific procedures to apply to this task, this lesson provides guidelines for the factors to be considered.

Objective:

Participants will select the media most appropriate for accomplishing a given objective using the Media Selection Table from this lesson. The chosen media must agree with the principles set forth in this lesson.

Evaluation Activities:

Participants will complete a practice exercise in selecting media for a real or simulated instructional situation.

Resources:

Instructor:

-Media Selection Table

-Answer Key - Assign. 8.2

Participants:

-Assign. 8.2 - Selecting Educational Media
for Instruction

-Media Selection Table

Instructional Approach:

Demonstrate the use of the Media Selection Table in Participant Reference Manual (pg. 99). Use the type and level of behavior to find information about appropriate categories of media. This procedure is similar to that used to select methods.

The instructor is to assign pg. 100 in the Participant Reference Manual and remain available to answer any questions which may arise as the participants work through the assignment. Participants may refer to the Lesson 2 content outline.

Explain that the medium or media selected as appropriate must be checked as to its availability. The task to be accomplished at this point in the development is to determine what specific titles or "pieces of media" are available to which a trainer has access. Also part of this process is the determination of what simple media materials may be produced in-house or by some other local source. All this information will, of course, be a factor in finally determining the Instructional Approach. Record the availability information on the Resources section of the IPW.

When participants are finished, lead a discussion of the items and participants' responses. An answer key is provided. Since numerous valid answers are likely, ask participants to defend their choices.

In the course of the discussion, make sure the following points are covered:

1. Media selection is a subjective decision and is not entirely scientific, but we must consider different ways to present instruction instead of relying on the methods each of us is use to using.
2. The final decision on the media to be used includes consideration of what is available or what a trainer can create or has created.

MEDIA SELECTION TABLE

TYPES OF BEHAVIOR

Categories of Media	I	Cognitive	I	Psychomotor	I	Affective
TANGIBLE AIDS	I		I		I	
Objects	I	E	I	G	I	P
People	I	E	I	E	I	F
Models	I	E	I	G	I	P
Games and gimmicks	I	E	I	G	I	G
Simulation and role play	I	E	I	G	I	E
Computers	I	E	I	P	I	P
STILL PICTURES	I		I		I	
Photographs	I	F	I	P	I	P
35mm color slides	I	E	I	P	I	P
Filmstrips	I	G	I	P	I	P
Overhead Transparency	I	E	I	P	I	P
Chalkboard	I	E	I	P	I	P
Charts and posters	I	G	I	P	I	P
MOVING PICTURES	I		I		I	
Commercial 16mm movie	I	G	I	G	I	G
8mm loop film	I	G	I	G	I	F
Local film	I	E	I	E	I	G
Instructional TV	I	E	I	F	I	P
Video tape	I	E	I	G	I	P
AUDIO MEDIA	I		I		I	
Professional tape	I	G	I	P	I	P
Local tape	I	G	I	P	I	P
WRITTEN MATERIALS	I		I		I	
Books	I	E	I	F	I	P
Workbooks	I	E	I	F	I	P
Periodicals	I	G	I	F	I	F
Handouts	I	G	I	F	I	P
Programmed Notes	I	G	I	G	I	P

Legend: E - Excellent

G - Good

F - Fair

P - Poor

UNIT EIGHT: SELECTING MEDIA FOR INSTRUCTION
LESSON 3 of 5: SELECTING EDUCATIONAL MEDIA FOR INSTRUCTION

Answer Key - Assignment 8.2

1. My students must be able to check automatic flow recording equipment for correct operation.

Cognitive-Application/Appropriate media:

1. The equipment itself (tangible).
 2. A portrayal of the equipment to be checked (still pictures).
 3. A check list or procedural outline (written materials) for checking the equipment.
2. My students must know fifteen conversion factors commonly used in day-to-day treatment operations.

Cognitive-Knowledge/Appropriate media:

1. An overhead transparency listing the factors (still pictures).
 2. A list of the factors within a text or in a handout (written materials).
 3. A computer program drilling the conversion factors (tangible aids).
3. My students must be courteous to other employees.

Affective/Appropriate media:

1. Film or videotape of employees displaying the desired behavior (moving pictures).
 2. A slide-tape might be effective if the attitude can be conveyed without motion (still pictures, audio media).
 3. Simulation or role playing (tangible).
 4. Live discussions are also useful (audio media).
4. My students need to understand the internal construction of a large piece of plant equipment.

Cognitive-Comprehension/Appropriate media:

1. The actual equipment disassembled (tangible).
2. A model of the equipment (tangible).
3. Slides, posters or other series of pictures of the internal construction of the equipment (still pictures). Moving pictures would only be necessary if the internal construction can only be understood in operation.

5. My students must know how to determine settleable solids, ml/liter.

Cognitive-Application/Appropriate media:

1. The equipment used in the process (tangible).
2. A film of the procedure (moving pictures).
3. An illustrated written description of the procedure (written materials).
4. A filmstrip or slide series portrayal of the procedure (still pictures).
5. A computer drill program (tangible).

UNIT EIGHT: INSTRUCTIONAL MEDIA AND RELATED RESOURCES
LESSON 4 of 5: SOURCES OF TRAINING MATERIALS

Estimated time:

45-60 minutes

Entering Competencies:

The participant must be aware of the various types of media and know the advantages and disadvantages of each.

Justification:

With a wide assortment of media available to the instructor, it is imperative they know how to locate this media. This lesson will discuss the major sources for existing media for environmental training.

Objective:

Participants will describe the services for locating media offered by the Instructional Resources Information System (IRIS), EPA's Instructional Resources Center (IRC), the National Environmental Training Association (NETA), and local sources.

Evaluation Activities:

Oral responses will serve as the evaluation activity for this lesson.

Resources:

Instructor:

- Content Outline
- Fig. 8.2 - IRIS
 - 8.3 - IRIS Abstract Contents
 - 8.4 - Community Resources
- Sample IRIS Abstracts

Participants:

- Content Outline
- Sample IRIS Abstracts

Instructional Approach:

This lesson consists of a lecture introducing participants to the IRIS data base, IRC bulletin, NETA and local resources. A content outline is provided to guide the lecture. Figures are keyed in the content outline.

1. Introduce IRIS and describe its usefulness as a resource bank for instructional materials related to wastewater treatment and water quality education.
2. Explain how to use the IRIS Compilation to get information about the resources in the collection. Include a discussion of the items in the IRIS resumes and of the indexes which facilitate locating items of interest to the user.
3. Inform the participants about the location of information on obtaining copies of resources listed in IRIS.
4. Briefly note the access data base for computer searches of the IRIS Compilation.
5. Describe the IRC and its origins.
6. Explain the purpose of the IRC.
7. List and briefly explain each of the following components.
 - a. IRC Viewing Facilities
 - b. IRC Lending Library
 - c. IRC Bulletin
8. Call on participants to explain the nature, purpose, and components of the IRC.
9. Encourage participants to write to EPA and subscribe to the IRC Bulletin. It will keep them informed about available instructional resources. The address is EPA Instructional Resources Center, The Ohio State University, 1200 Chambers Road, Columbus, OH 43212.
10. Describe NETA as an additional resource available to environmental trainers.
11. Describe the nature, purpose and services of NETA, including NETA's contact address, 970 Mill Pond Rd., Suite A, P.O. Box 346, Valparaiso, IN 46383.

12. Ask questions to assess participants' understanding of NETA.
13. Introduce the notion of community resources. Explain there are many sources of materials and expertise available within local communities.
14. List and briefly explain each of the major community resources.
15. Ask participants to suggest additional resources.

UNIT EIGHT: INSTRUCTIONAL MEDIA AND RELATED RESOURCES
LESSON 4 of 5: SOURCES OF TRAINING MATERIALS

Content Outline

I. Instructional Resources Information System (IRIS). (use Fig. 8.2.)

A. Introduction

1. Nature of IRIS.

IRIS is a computer-based information system managed by U.S. EPA Instructional Resources Center (EPA IRC) which acquires, reviews, indexes, and announces both print and non-print instructional materials.

IRIS currently lists information about 10,000 printed or audio/visual instructional resources which are available from various individuals, state and federal government agencies, educational institutions and commercial companies throughout the country. Materials selected for IRIS must be available.

2. Purpose of IRIS.

The purpose of IRIS is to provide a central source of information about available instructional materials related to wastewater treatment, water quality and pesticide education and instruction.

3. Locating materials in IRIS.

The user can locate information about the resources contained in IRIS by manually searching the collection or by a computer search of the collection. Following are the details of both kinds of searches.

B. Locating materials in IRIS by manual search.

1. Source of information.

"A Compilation of Abstracts to Water Quality and Water Resources Materials" is available in paper copy from the U.S. EPA Instructional Resources Center (EPA IRC), The Ohio State University, 1200 Chambers Road, Room 310, Columbus, OH 43212.

2. IRIS Resumes

The IRIS Compilation has resumes of information about every resource in the collection. As applicable, the following items of information are provided in the resume for each resource. (Use Fig. 8.3.)

Have the participants open their manuals to Unit 8, Lesson 4, IRIS Sample Abstract entitled, "Entry in IRIS Only." Use this to exemplify each of the following items provided in an IRIS resume

- a. Accession Number - the identification number. All identification numbers for items in IRIS begin with the letters, EW.
- b. Publication Date
- c. Title
- d. Author(s) - (not applicable in the "Sample").
- e. Institution where prepared - a sponsoring agency may be cited.
- f. Availability - where the material can be obtained.
- g. Descriptors - subject terms which characterize the content and form of the materials. Major descriptors are preceded by an asterisk.
- h. Descriptive notes - various items of information like the number of pages in a printed resource, the kind of binding, the price as quoted at the time the item was entered into the IRIS collection, etc.
- i. Abstract - a brief description of the contents of the resource
- j. ERIC Information

Some of the resources in the IRIS collection are also entered in the Educational Resources Information Center (ERIC) collection. (ERIC is another, more extensive national information system designed and developed by the National Institute of Education.)

Have participants turn to the other IRIS Sample Abstract in their manuals. This one is entitled, "Entry in IRIS and ERIC." Use this to exemplify the following.

1. Items entered in both systems have an IRIS (EW) and also an ERIC (ED) identification number. The EW number, however, does not appear in Resources in Education. (RIE)
 2. For items in the ERIC system, the resume includes a note, "ISSUE," which tells where to find the ERIC write-up of the item. In the sample, the reference is to an ERIC publication, Resources in Education.
3. Locating resumes of interest.
- a. Manual scan - A person can scan through the resumes in the IRIS Compilation to locate resources which meet particular instructional needs.
 - b. Subject index - The Compilation also contains a list of the subjects (descriptors) of the resources and the IRIS identification number for the related resource. Then the resume can be easily located to provide details about the resource.
 - c. Author index - A user may know the author of a resource. An author index to IRIS identification numbers is in the Compilation.
 - d. Institution index - The Compilation also contains an institution (agency) index to IRIS identification numbers.
 - e. Title index - This index is not in the Compilation. It is a separate document which contains all the titles entered in the Compilation. This index is available from the source given for the Compilation. (IB above).

C. Obtaining copies of resources.

The resume for the resource contains information about the source and cost of the resource.

1. Printed materials

These are available in one or both of two forms.

- a. Hard copy - paper similar to xerox copies.

- b. Microfiche - 4" x 6" sheets of microfilm on which up to 96 pages of text are reproduced. The microfilm can be enlarged and copied page for page on reader-copier equipment.

2. Audiovisual materials

As applicable, the source for purchase of audiovisuals is given as part of the resume.

D. Locating materials in IRIS by computer search.

1. Access database for IRIS.

CompuServe is the database vendor serving as the access to the computer tapes of the IRIS collection. For a modest fee, you can arrange to have a computer search of IRIS according to your needs.

2. Access databases for ERIC.

Many IRIS resources are also entered in the ERIC System which includes a computer tape of that collection. BRS, Systems Development Corporation, Dialog and CompuServe are current vendors of computer searches of the ERIC tapes.

3. Information about locations of access databases.

Contact the EPA Information Dissemination Project for information.

4. Obtaining copies of resources.

After choosing resources from the resumes provided by a computer search, the procedure for obtaining copies is the same as in manual searches.

E. Conclusion.

Conclude by asking participants questions which require oral explanations about the nature and purpose of IRIS, the type of information found in IRIS resumes and the procedures one can use to search the IRIS Compilation.

Entry in IRIS Only

EW003821

PUBLICATION DATE: (78)

TITLE: WPCF Wastewater Treatment Plant Operator Training Program,
Intermediate Course: Student Workbook, Vol. A, Parts 1 and 2.

INSTITUTION NAME: Water Pollution Control Federation

AVAILABLE FROM: Water Pollution Control Federation, 2626 Pennsylvania
Ave., Washington DC 20037

DESCRIPTOR: *Activated Sludge; Audiovisual Aids; Certification;
*Clarification (Wastewater); Environmental Technicians;
*Instructional Materials; Job Skills; *Operations
(Wastewater); Pollution; *Post Secondary Education;
*Wastewater Collection; *Wastewater Treatment; Water Pollution
Control

DESCRIPTIVE NOTE: 244 pages. Course Materials: 35mm slides (340), 9 tape
cassettes, administrator handbook, carrying case, and student workbook
(parts 1 and 2) - order no. E0291, \$400.00; student workbook only - order
no. E0292, \$4.50; other volumes: EW003822 and EW003823

This document is one in a series of self-instructional workbooks for
training wastewater treatment plant operators in the basic functions of
facility operation. The workbook contains a pre- and post-test
questionnaire for each unit as well as self-tests as interim guides. The
units discussed in the volume are a general introduction, the community
wastewater system, pre-treatment, clarification, and activated sludge.

IRIS Sample Abstract

Entry in IRIS and ERIC

SE003836

ED157796

PUBLICATION DATE: (71)

TITLE: A Guide to the Common Diatoms at Water Pollution Surveillance System Stations.

PERSONAL AUTHOR: Weber, Cornelius I.

INSTITUTION CODE: BBB06755

INSTITUTION NAME: Environmental Protection Agency, Cincinnati, OH

AVAILABLE FROM: EDRS Price MF-\$0.83 HC-\$6.01 PLUS POSTAGE

DESCRIPTOR: Biology; Environment; *Instructional Materials; *Microbiology; *Plant Identification; Post Secondary Education; Science Education; *Taxonomy; *Water Pollution Control; Water Resources; *Diatoms

DESCRIPTIVE NOTE: 107 pages; Graphs may not reproduce well.

ISSUE: RIE DEC 78

This guide was developed by the United States Environmental Protection Agency (EPA) as a taxonomic reference for the identification of diatoms. The taxonomic information included consists of a generic key to the common genera of diatoms, a section illustrating 164 diatom species representing 43 common genera found at the Water Pollution Surveillance System (WPSS) stations, and an alphabetical list of the genera included in this publication. Related information includes collection and slide presentation procedures, a description of the structure of the diatom cell wall, and a glossary of terms used in diatom taxonomy. Also included is a map of the WPSS station locations in the United States and charts indicating the four most abundant diatom species at these WPSS stations. No information is given on the ecology of diatoms. (MR)

II. Information Resource Center (IRC)

A. The nature of IRC.

One of the results of the current national concern about pollution control has been the development of numerous publications and instructional programs designed to assist education and training personnel. Published documents by federal agencies, state agencies, educational institutions, and public interest groups address pollution control issue from a variety of perspectives. A review of the instructional materials available indicates that some duplication exists, and more significantly, there is a limited awareness of available resources by educators and trainers.

To assist with coordination and dissemination of educational information, the EPA's National Training and Operational Technology Center (NTOTC) formed the Instructional Resources Center (IRC) in 1978. With 1981 budget cuts, NTOTC ceased to exist and the IRC project was transferred to The Ohio State University.

IRC provides instructors with a systematic mechanism to obtain EPA-developed courses and programs as well as materials produced by other sources.

B. Purposes of IRC.

A major purpose of the IRC is to avoid unnecessary duplication of effort so available resources can be more effectively and efficiently used.

All IRC goals are intended to facilitate pollution control instruction by either incorporating quality materials into existing curricula or introducing new courses of study.

C. Components of IRC.

1. IRC Viewing Facilities.

Audio-visual preview facilities are maintained at the IRC. A variety of equipment is maintained to allow users to try various media and materials prior to allocating funds for purchases. A fee is charged for using the preview facilities, but these charges can be applied to the purchase of A/V materials.

In addition, sample copies of printed water quality and pesticides education/training materials are maintained and available for review.

2. IRC rental library.

The purpose of this component is to lend audiovisual instructional units to education and training organizations to support classroom activities.

Most of the units were developed to be used in EPA conducted courses and are not designed to be self-instructional. Rather, they are training tools to be used in an integrated presentation of a topic. Topics range from statistical analysis of pollution data to chemical and biological laboratory procedures.

3. IRC Bulletin.

The IRC serves as a major communication link with educational and training organizations. One of the methods used to maintain dialogue is the IRC Bulletin. The bulletin is available on a subscription basis (\$4.50 per year).

D. Conclusion

Conclude by asking participants questions which require oral explanations about the nature, purpose and components of the IRC.

III. National Environmental Training Association (NETA)

A. The nature of NETA.

The National Environmental Training Association (NETA) saw its beginning emerge from a workshop at the Environmental Resources Training Center, Southern Illinois University, in the summer of 1977. The meeting was convened to discuss the problems of environmental manpower development and training programs.

Foremost among needs identified in the meeting was the need for improved communications among individual trainers, educational institutions, training centers, and federal, state, and local agencies. The outcome of the meeting was the formation of a task force charged with the responsibility to draft a constitution for the establishment of a national training association.

A few months later, at the annual meeting of the Water Pollution Control Federation in Philadelphia, NETA was officially formed.

NETA is the only national association concerned entirely with the needs of environmental trainers.

B. Purposes of NETA.

1. Improved communications among individual trainers, training agencies and institutions, and governmental agencies.
2. Identification, development and evaluation of training aids to support environmental control facility personnel training.
3. Promotion of minimum standards for environmental control facility personnel training and the encouragement of reciprocity between states and training institutions for the transfer of credits.
4. Promotion of professionalism among environmental control facility personnel and the encouragement of qualified persons to enter the environmental control field.
5. Promotion of public awareness of the benefits of training for effective operation and maintenance of environmental control facilities.
6. Promotion of environmental control facilities as a community socioeconomic resource to attract development and stimulate growth.

C. Components of NETA.

1. Technical assistance and training services are provided at all levels.
 - a. Training programs are administered through vocational and technical schools, two-year and four-year colleges, state and local agencies, and consulting firms.
 - b. Delivery methods.
 1. On-site hand-on training.
 2. Workshops.
 3. Seminars.
 4. Short schools.
 5. Instruction via closed circuit audio and visual networks.
 6. Correspondence courses.
 7. Self instruction programs.

- c. The development and evaluation of curricula and training materials are important functions of the individual and institutional members of NETA.

Expertise in all aspects of curriculum and training materials development is found within the Association.

2. Regional coordinating network.

Each of seven regional coordinators serve as a communication link between the geographical areas in the United States and Canada and the NETA management staff and executive board.

3. Communication.

- a. NETA Newsletter and news bulletins.
- b. NETA National workshop and conference.
- c. Regional meetings.

- D. Conclusion.

Conclude by asking participants questions which require oral explanations about the nature, purpose and components of NETA.

IV. Community Sources (Use Fig. 8.4)

- A. Definition.

1. Sources of materials, information, and/or expertise available within a community.
2. Levels of resources.
 - a. State.
 - b. County.
 - c. Local (city, village, or town).

B. Types of resources.

1. Water plants.
2. Educational Institutions.
 - a. Colleges and Universities.
 - b. Vocational/Technical Schools.
3. Libraries.
 - a. Public and private.
 - b. Individual library collections and inter-library loans.
4. Trainees with special expertise.
5. Area Environmental Training Centers.
6. Special interest groups (i.e., Sierra Club).

UNIT EIGHT: INSTRUCTIONAL MEDIA AND RELATED RESOURCES
LESSON 5 of 5: USING TRAINING AIDS

Estimated time:

45-60 Minutes

Entering Competencies:

Participants must be aware of the various types of media and the advantages and disadvantages of each.

Justification:

With the availability of various types of media and instructional aids, it is important each participant be introduced to the principles of use of the most common materials.

Objective:

Participants will recall on an assignment the three major steps involved in the use of media and describe the process of visualization.

Evaluation Activities:

Participants' understanding of the content of this lesson will be evaluated through their completion of programmed notes, oral responses and use of media in presentations later in the course.

Resources:

Instructor:

-Content Outline

Participants:

-Content Outline

-One 3x5 card for each participant

-Programmed Notes

Instructional Approach:

This lesson covers the use of visual aids. The format will change throughout the lesson to show examples of various ways to use visual aids.

1. Begin by introducing the programmed notes pg. 117. This should move you through Item II in the outline. Stop at this point and discuss how programmed notes reduce note taking and involve the student. Point out the self check.

2. Using a blackboard or flip chart, develop a presentation for using films. Be sure to follow the "prepare," "present," and "reinforce" techniques.
3. Have students think up several ideas (you jot them down on the blackboard) that could be used to allow the students to use the information in a film after the film has been shown.
4. Discuss the benefits of visualization versus illustration. Several examples should be developed by the class as a:
 - a. A whole and recorded.
 - b. An overhead transparency.
 - c. A blackboard.
5. Have students play this game. Give each a 3 x 5 card. Have them write a formula on the side that has lines. After they are finished, have them turn the card over and visualize the formula (draw a picture of the formula at work).
6. Show the methods of developing good word overheads or slides.

UNIT EIGHT: INSTRUCTIONAL MEDIA AND RELATED RESOURCES
LESSON 5 of 5: USING TRAINING AIDS

Content Outline

I. Introduction

Use an analogy between training and pouring water into a container. The analogy is removing the lid (preparation), using a funnel (training aid use), pouring the liquid (presentation), and capping the jar (retention).

II. Rules of visual aid use.

- A. Always prepare before starting.**
- B. Use visual aids to focus instruction.**
- C. Give the student the opportunity to do something with the data being presented.**
- D. Basic steps**

1. Preparation

- a. Instructor preparation by previewing media and lesson plan.**
- b. Student preparation by reading assigned material and becoming mentally ready to accept new material.**

2. Presentation

"Pouring" of information.

3. Reinforcement

- a. Retention stage**
- b. Application of material.**
- c. Use worksheets, labs, problem solving.**

III. Using Specific Aids

- A. Films - video, slide shows, film strips, etc. Experience from military training programs show that film media should be viewed three times in a short period and that students don't always learn what you want them to learn.

1. Proper use.

a. Preparation.

1. Preview film.
2. List objectives.
3. Discuss the film before showing.
4. Plan to give students something to do with the information in the film after it is completed.

b. Presentation.

1. Provide lights so notes can be taken.
2. Stop the film as necessary to review fast moving segments.

c. Reinforcement.

Have students apply the information.

2. Don'ts.

- a. Don't show a film without previewing it.
- b. Don't show a film out of sequence or on the wrong subject.
- c. Don't leave the room during the showing.
- d. Don't rewind the film while students are completing a worksheet.
- e. Don't schedule a film at the end of a session.
- f. Don't show a film without proper opening discussion.
- g. Don't show a film without giving some assignment that allows the participants to use the material presented in the film.

3. Equipment checklist - moving pictures.

- a. Take up reel.
- b. Extension cord.
- c. Screen.
- d. Extra bulb.
- e. Projector positioned so a good sized image is shown.
- f. Have a clear path to the screen.

4. Equipment checklist - slides.

- a. Slide trays.
- b. Sync cord.
- c. Extension cord.
- d. Extra bulb.
- e. Zoom lens.
- f. Screen.

5. Equipment checklist - video tape.

- a. Adapter cords.
- b. Extension cords.
- c. One monitor per 24 students.

B. Diagrams - blackboards, flip charts, transparencies and slides.

Note that it is important to visualize, not to illustrate. Studies have shown that retention of information improves from 20 percent to 50 percent when visualization is used instead of illustration.

1. Use of diagrams.

- a. Plan the board layout.
- b. For slides and overheads, do your own layout then have the artist complete the project.

- c. Insure the visual deals with the objective of the lesson.
- d. Properly align projectors for a square and focused presentation.
- e. When using only a few visuals, explain the purpose of the visual before it is shown.
- f. Use a lighted pointer for slides.
- g. Cover points on overheads that are to be referred to later.
- h. Stand where you are the most comfortable at the screen or at the projector table.
- i. Give students something to do with the information either during or after the lecture.

2. Don'ts

- a. Don't write long sentences that you want students to copy.
- b. Don't make a list without a heading - students will lose their place.
- c. Don't change subjects without erasing the blackboard.
- d. Don't use words when a visual would be better.
- e. Don't proceed without preplanning.
- f. Don't read a list of data or verbally try to describe how to solve a math problem - use the blackboard.
- g. Don't use small visual images.
- h. Don't place too much material on a visual.

3. Blackboard and flip chart use.

- a. Don't worry about handwriting.
- b. Use the blackboard for listing student responses.
- c. Preplan their use.
- d. Visualize.
- e. Spell words correctly.

4. Word visuals - slides and transparencies.

Note that slides and transparencies should be used when you must because of time, money and logistical considerations.

- a. Identify the objective of the lesson.
- b. Use 24 point type or larger (there are 72 points in an inch).
- c. When using slides, type the words with a proportional space typewriter.
- d. Make one visual for each point that you want to cover.
- e. Place overheads in frames.
- f. Number the overheads.
- g. Place note pages between overheads.
- h. With slides, make a description list of all the slides in the program for your use.
- i. Use programmed notes or worksheets to reduce student note taking time.

BASIC INSTRUCTIONAL TECHNOLOGY

UNIT NINE

LESSON PLANNING - Unit Overview

Overview:

Lesson planning is the final stage in designing instruction. It involves the preparations for the actual delivery of the instruction to learners. This unit presents nine rules for making instruction effective and efficient and teaches participants to use the IPW as a plan for delivering instruction.

Options:

1. Speakers need only Lessons 1 and 2.

Summary of Unit Activities

Lesson Title	Instructional Methods	Time	Support Materials
1. Overview	Lecture	50-75 Min.	Content Outline Fig. 9.1-9.6
2. Principles of Instruction	Assignment	60-75 Min.	Assign. 9.1
3. Exercise in Planning a Lesson	Assignment	45-60 Min.	Assign. 9.2

UNIT NINE: LESSON PLANNING
LESSON 1 of 3: OVERVIEW

Estimated time:

60-75 minutes

Entering Competencies:

Before beginning this lesson, participants should be familiar with the IPW form.

Justification:

Between the stages of designing and implementing instruction lie a set of activities which are extremely important but often overlooked. Lesson planning involves an instructor in specifying explicitly the activities by which he will teach and students will learn. It is a blueprint for accomplishing instruction; a schedule of the activities and resources for meeting objectives.

Objective:

Participants will describe the kinds of activities involved in completing an Instructional Package Worksheet.

Evaluation Activities:

Participant discussion of the content will serve as the evaluation activity for this lesson.

Resources:

Instructor:

- Content Outline
- Fig. 9.1 - Develop Instructional Strategies
- 9.2 - Instructional Package Worksheet
- 9.3 - Purpose of Lesson Planning
- 9.4 - Completing an Instruction Package Worksheet
- 9.5 - Instructional Resources
- 9.6 - Instructional Approach

Participants:

- Content Summary

Instructional Approach:

This lesson consists of a lecture which provides and overview of the unit. A content outline is provided; accompanying figures are keyed in the text.

1. Review the lesson objective.
2. Describe the placement of this unit in the Systematic Approach; use Fig. 9.1.
3. Describe the structure and use of the Instructional Package Worksheet. Use Fig. 9.2-9.3; refer students to pg. 120 in Participant Reference Manual.
4. Identify and explain each of the components. Identify concerns in responding to each. Refer students to pg. 120 in Participant Reference Manual.
5. Complete an example IPW, calling on students for suggestions. One of the objectives developed during class in Unit Five can be easily used. (Use Fig. 9.2 - Instructional Package Worksheet.) (Be sure to use non-permanent ink if you wish to use the transparency again.)
6. Discuss the importance of review and revision.
7. Call on participants to review the concepts and procedures presented.

UNIT NINE: LESSON PLANNING
LESSON 1 of 3: OVERVIEW

Content Outline

I. Structure of Unit Nine

Use Fig. 9.1 to show the placement of instructional strategy development in the systematic approach model. Introduce the unit as the culmination of the study of instructional design. Inform participants that, by the end of the unit, they will plan a lesson to teach a single objective. Describe the structure of the unit, the placement of instructional strategies in the Systematic Approach.

A. Lesson 1: Overview.

B. Lesson 2: Principles of instruction.

Nine rules for making instruction effective.

C. Lesson 3: Completing the instructional package worksheet.

Describing entering competencies, a justification for the lesson, the instructional resources to be used, and the instructional approach followed.

II. The Instructional Package Worksheet

Describe the contents and purpose of the Instructional Package Worksheet (IPW) as an example format for planning a single lesson. Review contents of entire IPW. Use Fig. 9.2 and 9.3.

A. Components.

1. Entering Competencies.

2. Justification.

3. Objective.

4. Evaluation Activities.

5. Resources.

6. Instructional Approach.

III. The IPW as a Lesson Plan

- A. A lesson plan describes in detail and in order what must be done to teach a single objective.
- B. What a lesson plan specifies.
 - 1. What trainees must know or be able to do before they begin the lesson.
 - 2. Why this particular skill or knowledge is important.
 - 3. What trainees will do as a result of learning.
 - 4. How the learning will be assessed.
 - 5. What materials and equipment the instructor will use to teach the lesson.
 - 6. What the instructor will do to help trainees learn.

IV. Purpose of a Lesson Plan

A. Organization.

Writing down exactly what you plan to do in the order you plan to do it helps you to organize the instruction. It helps you decide when to incorporate media, when to provide practice, and when and how to give feedback.

B. Creation of a permanent record.

Once written down, lesson plans are reusable; they can be shared with other instructors who must teach the same skills, thus helping to avoid needlessly "reinventing the wheel."

C. Answering demands for accountability.

A lesson plan is evidence of what happened during a lesson. It can help in the planning of future lessons by identifying instructional techniques that are effective or ineffective in particular situations.

Discuss briefly with participants their conceptions of lesson planning and of the role of the IPW in preparing to teach a lesson.

V. Completing the Instructional Package Worksheet

Review the components of the IPW and remind participants that the lesson objective and evaluational activity have already been described. Briefly describe the four components of the IPW yet to be completed. Explain that specification of the four components follows the nine rules participants will study in Lesson 2. Use Fig. 9.4.

- A. Specify the entering competencies.
- B. Provide a justification for the objective.
- C. State the objective.
- D. State the evaluation activities.
- E. List the resources needed to carry out instruction.
- F. Describe the instructional approach.

VI. Specifying Entering Competencies

Explain the term "Entering Competencies"; describe how entering competencies are identified and how the instructor can insure trainees possess the necessary skills and knowledge. Demonstrate completing this section on the IPW. Use Fig. 9.2. Remind participants that, on the Task Detailing Sheet, they had identified steps that do not need to be taught. Those steps, which represent knowledge and skills that trainees should already possess, can be specified as entering competencies.

- A. Definition: Skills and knowledge that trainees must possess before they are ready to learn the behavior specified in the objective.
- B. Task analysis as means of determining prerequisites.

Use Task Detailing Sheet to identify skills and knowledge that trainees should already possess (Column D: steps that need not be taught.)

- C. Insuring trainees possess prerequisite capabilities.
 1. Pre-testing.
 2. Remedial instruction.

VII. Providing a Justification for the Objective

Explain the concept "Justification." Demonstrate the specification of a justification on the IPW. Use Fig. 9.2.

Provide a rationale for trainees which explains why the objective is important. The justification should refer directly to the occupational use of the skill or knowledge described in the objective and will relate back to the Problem Definition phase.

VIII. Stating the Objective

Remind participants they have already stated objectives. They must now transfer that objective to the IPW. Demonstrate, using Fig. 9.2.

IX. Stating the Evaluation Activities

Remind participants they have already stated evaluation activities. They must now transfer those statements to the IPW. Demonstrate, using Fig. 9.2.

X. Listing the Resources Needed to Carry Out Instruction

Define "Resources." Demonstrate the process of identifying instructional resources. Remind participants that training materials must be prepared or obtained at this point, use Fig. 9.5.

- A. Definition: Anything an instructor or trainee uses during instruction is a resource.
- B. In Unit Seven, available resources were identified and used to select instructional methods. Those resources must now be matched with the activities they support and other necessary resources identified and prepared.
 - 1. Prepare content outlines for lectures.
 - 2. Write specific questions for guided discussions.
 - 3. Select/prepare instructional support materials.
 - a. Figures, slides, films.

- b. Handouts.
 - c. Demonstration materials and equipment.
- 4. Select/prepare trainee materials.
 - a. Readings.
 - b. Exercises.
 - c. Worksheets.
 - d. Tests.
 - e. Procedural manuals.
- C. List resources on the Instructional Package Worksheet.
 - 1. Content outline/discussion questions.
 - 2. Figures.
 - 3. Assignments.
 - 4. Media (materials and equipment).

XI. Describing the Instructional Approach

Describe the activities involved in specifying the "Instructional Approach." Relate Methods Specification to activity descriptions; focus on describing activities in terms of what the instructor will do to help trainees master objectives. Relate the process to the nine principles of effective instruction which will be covered in Lesson 2 (Use Fig. 9.6.)

- A. Definition: The sequence of activities which an instructor uses to teach a lesson.
- B. Methods and activities.
 - 1. Activities describe the means by which instructional methods are carried out (e.g., if the method is lecture, the activities will be: (1) delivers lecture; (2) shows figures on overhead projector; and (3) distributes handouts).
 - 2. Methods are the source of activities.
 - 3. Activities should be listed briefly, succinctly, and in order.

C. The process.

1. List activities in terms of the methods selected.
2. For each method, identify all activities that will be needed to implement the method.
3. Describe the activities in terms of what the instructor must do.

Demonstrate specifying resources and instructional approach on the IPW. Use Fig. 9.5.

XII. Reviewing the Instructional Package Worksheet

Describe the review stage of planning. Emphasize the importance of revisions in the preparation for re-using IPW's.

- A. Review the Instructional Package Worksheet prior to teaching the lesson to insure the IPW contains all information necessary to teach the lesson.
- B. Review the Instructional Package Worksheet after teaching the lesson.
 1. Note any particularly effective activities and materials.
 2. Revise the Instructional Package Worksheet to eliminate/modify ineffective activities and materials.

UNIT NINE: LESSON PLANNING
LESSON 2 of 3: PRINCIPLES OF INSTRUCTION

Estimated time:

60-75 minutes

Entering Competencies:

Before beginning this lesson, participants should be able to describe the kinds of activities involved in completing an Instructional Package Worksheet.

Justification:

Research on teaching has revealed several principles for making instruction effective and efficient. An understanding of these principles will help instructors to plan good instruction.

Objective:

Participants will define and give an example of the application of each of the nine rules for effective instruction and will select or create components of a hypothetical lesson which exemplify the nine rules.

Evaluation Activities:

Completion of a written, self checked post-test will serve as the evaluation activity for the lesson.

Resources:

Instructor:

-None

Participants:

-Assign. 9.1 - Principles of Instruction

Instructional Approach:

This lesson consists of an individual assignment.

1. Refer participants to the assignment package in their manuals, pg. 124. Make certain they understand the directions. Allow 60 minutes for completion of the assignment which includes a post-test. (If you are instructing a group of speakers, write two instructional objectives on the board for their use.)

2. Discuss the assignment and the answers to the post-test with the participants. Answers will vary since the post-test involves individual choices of components for a lesson on writing behavioral objectives.

UNIT NINE: LESSON PLANNING
LESSON 3 of 3: EXERCISE IN PLANNING A LESSON

Estimated time:

45-60 minutes

Entering Competencies:

Before beginning this lesson, participants should be able to describe the procedures involved in lesson planning and completing an IPW for a single instructional objective.

Justification:

Practice is an important determinant of learning. This lesson provides students with practice in planning a lesson.

Objective:

Given an IPW, participants will plan a lesson and complete an IPW for that lesson.

Evaluation Activities:

Completion of an IPW designed to teach a simple objective will serve as the evaluation activity.

Resources:

Instructor:

-None

Participants:

-Assign. 9.2 - Lesson Planning Exercise

Instructional Approach:

This lesson consists of an application exercise, which is the culmination of the simulation exercise begun in Unit Seven.

1. Refer participants to the assignment for this lesson in their manuals, pg. 138. Describe the requirements of the exercise and the desired product. Review the directions.
2. Supervise participants during the exercise.
3. Discuss the finished products and any problems that arose during the exercise.

BASIC INSTRUCTIONAL TECHNOLOGY

UNIT TEN

DEVELOPMENT OF PRESENTATIONS - Unit Overview

Overview:

The development of good teaching skills requires practice. In this unit, participants have the opportunity to apply many of the skills they have learned throughout the workshop. Each participant defines the objectives, develops evaluation items, and designs the instruction and supporting figures for a 15 minute lesson. These lessons will be presented and evaluated as part of the conduct of Unit Eleven.

Options:

1. Speakers need only Lesson 1.
2. Trainers and superintendents should receive only Lesson 2.

Summary of Unit Activities

Lesson Title	Instructional Methods	Time	Support Materials
1. Working from Prepared IPW's	Student Presentations	60-90 Min.	Partially Completed IPW's Acetates and Felt Pens
2. Developing an IPW and Presentation	Student Presentations	120-150 Min.	IPW's Acetates and Felt Pens

UNIT TEN: DEVELOPMENT OF PRESENTATIONS
LESSON 1 of 2: WORKING FROM A PREPARED IPW

Estimated time:

60-90 minutes.

Entering Competencies:

The unit requires participants to apply the concepts and skills gained throughout the entire workshop.

Justification:

Practice is a valuable tool to reinforce the learning of the workshop content.

Objective:

Given one of the partially completed IPW's in the Participant Reference Manual, the student will apply the principles of the workshop to completing the justification, evaluation activities, resources, and instructional approach sections, developing visual aids and presenting a 15 minute lesson.

Evaluation Activities:

Each student in the group, as well as the instructor will critique the participants' presentations with the aid of the Presentation Rating Scale and orally.

Resources:

Instructor:

-Partially Completed IPW's

Participants:

-Partially Completed IPW's

-Acetates and felt pens

-Other resources as determined by participants

Instructional Approach:

As a general introduction to both lessons, note that the difference between the two are only that participants who will be developing instructional materials (as opposed to only presenting instruction) will start from scratch. Speakers, those who will only be presenting instruction, will be supplied with the same materials they will be provided with in a working situation.

Explain the nature and objectives of Unit Ten. Remind participants how the workshop has been specifically designed to prepare them for this activity.

Have the participants turn to pgs. 142-148 in their Participant Reference Manuals. They will each choose one of the partially prepared IPW's to present. Direct them to complete the blank sections on the IPW they have chosen. Allow them to utilize acetates for transparency production or assemble other audiovisual media if possible. Each participant will be allowed 15 minutes for their presentation.

Note that the participants have one hour to practice their presentations. If possible, locate extra rooms or space of some type for their practice sessions.

Try to reduce any anxiety about giving the lessons. Occasionally inform participants of the time remaining for this unit and remind them to allow enough time to practice presentations. End the unit on schedule.

UNIT TEN: DEVELOPMENT OF PRESENTATIONS
LESSON 1 of 2: WORKING FROM A PREPARED IPW

INSTRUCTIONAL PACKAGE WORKSHEET

CURRICULUM: Environmental Technology.

COURSE: Introduction to Environmental Technology.

UNIT: I: Introduction.

LESSON: 1 of 5: Natural Cycles.

Estimated time: 10-15 minutes.

Entering Competencies: None.

Justification:

Objective: From memory, the student will draw a diagram of the hydrologic cycle and label five parts to include:

1. Precipitation.
2. Evaporation.
3. Percolation.
4. Infiltration.
5. Transpiration.

Evaluation Activities:

Resources:

Instructional Approach:

INSTRUCTIONAL PACKAGE WORKSHEET

CURRICULUM: Environmental Technology.

COURSE: Introduction to Environmental Technology.

UNIT: II: Epidemiology.

LESSON: 2 of 3: Enteroviruses.

Estimated time: 10 minutes.

Entering Competencies: Students must be able to describe the relationship between epidemiology and environmental protection.

Justification:

Objective: From memory, the student will define epidemiology and list four major problems which block the effective removal of enteroviruses from the environment.

Evaluation Activities:

Resources:

Instructional Approach:

INSTRUCTIONAL PACKAGE WORKSHEET

CURRICULUM: Environmental Technology.

COURSE: Introduction to Environmental Technology.

UNIT: III: Public Water Supply.

LESSON: 4 of 10: Indicator Organisms.

Estimated time: 10 minutes.

Entering Competencies: The student must be able to define "bacteria."

Justification:

Objective: From memory, the student will list three prerequisites for an indicator organism and identify *E. coli* and *Aerobacter aerogenes* as the indicator organisms for drinking water.

Evaluation Activities:

Resources:

Instructional Approach:

INSTRUCTIONAL PACKAGE WORKSHEET

CURRICULUM: Environmental Technology.

COURSE: Introduction to Environmental Technology.

UNIT: IV: Chlorination.

LESSON: 5 of 10: Residual Chlorine.

Estimated time: 10-15 minutes.

Entering Competencies: The student must be able to list the characteristics of chlorine and identify the factors that affect chlorination.

Justification:

Objective: Given a graph showing residual chlorine on the y axis and chlorine dosage on the x axis, the student will sketch the line showing chlorine addition to both distilled water and drinking water. On the graph, the following must be identified:

1. Chlorine combining with chemicals.
2. Combined chlorine residual.
3. Breakpoint.
4. Free chlorine residual.

Evaluation Activities:

Resources:

Instructional Approach:

INSTRUCTIONAL PACKAGE WORKSHEET

CURRICULUM: Environmental Technology.

COURSE: Introduction to Environmental Technology.

UNIT: V: Introduction to Wastewater.

LESSON: 1 of 10: Flow Patterns.

Estimated time: 10-15 minutes.

Entering Competencies: None.

Justification:

Objective: Given the names of various process units found in a trickling filter and an activated sludge plant, the student will arrange them in a normal flow pattern, to an accuracy of 90 percent.

Evaluation Activities:

Resources:

Instructional Approach:

INSTRUCTIONAL PACKAGE WORKSHEET

CURRICULUM: Environmental Technology.

COURSE: Introduction to Environmental Technology.

UNIT: VI: Introduction to Solid Waste.

LESSON: 1 of 10: Decomposition.

Estimated time: 10-25 minutes.

Entering Competencies: None.

Justification:

Objective: From memory, the student will describe the decomposition process. Included in the discussion must be the following:

1. Three products of decomposition.
2. One problem resulting from decomposition.
3. The solution to that problem.

Evaluation Activities:

Resources:

Instructional Approach:

INSTRUCTIONAL PACKAGE WORKSHEET

CURRICULUM: Environmental Technology.

COURSE: Introduction to Environmental Technology.

UNIT: VII: Introduction to Air Pollution.

LESSON: 1 of 10: Air Pollutants.

Estimated time: 10-15 minutes.

Entering Competencies: None.

Justification:

Objective: From memory, the student will list five of the seven air pollutants for which control laws have been written.

Evaluation Activities:

Resources:

Instructional Approach:

UNIT TEN: DEVELOPMENT OF PRESENTATIONS
LESSON 2 of 2: DEVELOPING AN IPW AND PRESENTATION

Estimated time:

120-150 minutes

Entering Competencies:

The unit requires participants to apply the concepts and skills gained throughout the entire workshop.

Justification:

Practice is a valuable tool to reinforce the learning of the workshop content.

Objective:

Workshop participants will define an objective, design evaluation items, plan the instruction (including the preparation of an Instructional Package Worksheet) and prepare a presentation of one lesson on a topic of their choice. Finally, when delivered, the presentations should exhibit the characteristics of good teaching and presentation skills.

Evaluation Activities:

A presentation rating scale is to be used for evaluating the presentations. Copies of the participants' IPW's (especially the objective statements) and their evaluation items will be critiqued by the instructor.

Resources:

Instructor:

-None

Participants:

-Instructional Package Worksheet blanks

-Acetates and felt pens

-Other materials and media as determined by participants

Instructional Approach:

As class begins, explain the nature and objectives of Unit Ten. Remind participants of how the workshop has been specifically designed to prepare them for this activity.

Have participants choose the specific topic they will prepare. For each lesson, direct them to specify an objective and plan 15 minutes of instruction using the Instructional Package Worksheet, page 149, to record their plans. Direct them also to develop three evaluation items for use in testing the achievement of their lesson's objective. The completed Instructional Package Worksheet and the evaluation items should be checked by the instructor as the student completes them.

Note that the participants have two hours to prepare their lessons and to practice their presentations. If possible, locate extra rooms or space of some type for practice sessions.

Assist participants as they prepare lessons. However, allow them to make all of their own design decisions. For specific procedural questions refer them to relevant sections of the Participant Manual. Try to reduce any anxiety about preparing and giving the lessons. Encourage them to prepare transparencies and handouts in their presentations. Occasionally inform them of the time remaining for this unit and remind them to allow enough time to practice presentations. End the unit on schedule.

BASIC INSTRUCTIONAL TECHNOLOGY

UNIT ELEVEN

PRESENTATIONS - Unit Overview

Estimated time:

90-120 minutes

Overview:

This unit is intended as an application of the basic instructional technology subjects covered in this workshop. It enables participants to reinforce their understanding of these subjects while providing an opportunity for them to practice their presentation skills. (The content, objectives, Instructional Package Worksheets, and support materials for teaching this unit are developed by workshop participants as part of Unit Ten's activities.)

Options:

All students need to complete this unit.

Entering Competencies:

It is expected that no one will begin this unit without having achieved the objectives of all preceding units.

Justification:

Practice is a valuable tool in reinforcing the concepts used throughout the workshop.

Objective:

The participant will practice presentation skills and use rating scales to evaluate the presentations of other participants.

Evaluation Activities:

Presentation Rating Scales will be completed by the participants to evaluate each presentation. The participants' Instructional Package Worksheets and evaluation items will be collected by the instructor when this unit begins. The instructor will critique each student's prepared IPW (especially the objective).

Resources:

Instructor:

- Presentation Rating Scales
(six copies for each participant provided by instructor as well as copies for instructor.)
- Fig. 11.1 - Deliver Instruction

Participant:

- Unit Ten materials
- Presentation Rating Scales
(six copies for each participant provided by instructor.)

Instructional Approach:

1. Introduce the unit by showing Fig. 11.1 and explaining that although most people see this as "training," it comes late in the process.
2. Divide the participants into groups of five or six for the presentations, insuring each group has an instructor for the critique. Each participant presentation is to be 15 minutes long followed by a 10 minute critique.
3. Participants and the instructor will critique each presentation.
4. Stress positive aspects of the IPW's and presentations, while still thoroughly critiquing them.

BASIC INSTRUCTIONAL TECHNOLOGY

UNIT TWELVE REVIEW AND CONCLUSION - Unit Overview

Estimated time:

30-90 minutes

Overview:

As the conclusion of the workshop, this unit provides review for participants and an opportunity to receive feedback on their understanding of the major subject areas. Participants are also asked to provide the instructor with feedback on the strengths and weaknesses of the workshop itself.

Options:

All students need Unit Twelve.

Entering Competencies:

It is expected that everyone participating in this will have completed the workshop to this point.

Justification:

A final review of the instructional development process reinforces the learning of the concepts.

Objective:

Participants will describe the purpose of this workshop during discussion. Participants will also complete a workshop evaluation.

Evaluation Activities:

None

Resources:

Instructor:

-Workshop Evaluation Form

-Fig. 1.3 - The Instructional Development Process

Participant:

-Workshop Evaluation Form

Instructional Approach:

This unit should be approached as having two general purposes. The first is to gather information regarding both the extent of learning achieved by the participants and their opinions of the workshop itself. The second purpose is to provide closure to the workshop and answer any final questions which the participants may have.

1. Using Fig. 1.3, review the steps of the systematic approach. Invite participants to ask questions to clear up any confusion on the course materials.
2. Administer the Workshop Evaluation, Participant Reference Manual page 152. Have participants complete it anonymously. Ask them for their candid reactions and constructive suggestions for improving the workshop. This activity should take 15-20 minutes.
3. End the workshop with a discussion of how the Participant Reference Manual can be used as an important resource as the participants go on to plan and deliver their own workshops and instructional activities. If it seems appropriate, you may also want to describe the nature and availability of the Advanced Workshop on Instructional Technology. Answer any final questions.

UNIT TWELVE
REVIEW AND CONCLUSION

BASIC INSTRUCTIONAL TECHNOLOGY
EVALUATION FORM

Date: _____ Instructor: _____

Directions:

Check the most appropriate response to each of the following items.

1. Of the objectives covered, I can successfully perform:
 - ☐ All of them.
 - ☐ Some of them.
 - ☐ None of them.
2. The objectives were covered:
 - ☐ Too quickly.
 - ☐ Just right.
 - ☐ Too slowly.
3. In preparing for instruction in the future, the objectives covered were:
 - ☐ Important.
 - ☐ "Nice to know" but not important.
 - ☐ Irrelevant.
4. The tests and assignments were directly related to the stated objectives:
 - ☐ All of the time.
 - ☐ Some of the time.
 - ☐ Very little of the time.
5. Given my previous background in this subject, most of the material was:
 - ☐ Too advanced.
 - ☐ Just right.
 - ☐ Too basic.
6. Overall, I would rate this training activity as:
 - ☐ Excellent.
 - ☐ Fair.
 - ☐ Poor.

7. Reading materials used in the lessons were:

- ☐ Too difficult for my ability.
- ☐ Appropriate for my ability.
- ☐ Too elementary for my ability.

8. I can report my feelings about the training experience as:

- ☐ Enjoyable.
- ☐ Alright.
- ☐ Unpleasant.

ADDENDUM A

References and Glossary

REFERENCES

UNIT ONE

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UNIT TWO

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UNIT NINE

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UNIT TEN

None

UNIT ELEVEN

None

UNIT TWELVE

None

GLOSSARY

Affective Behavior - expressions of feeling or interest; the adoption of an attitude or belief; the motivation to do something.

Check List - a list of skills or tasks which the trainee is expected to demonstrate in the satisfactory performance of a job, behavior, etc.

Cognitive Behavior - actions which involve knowing, understanding or applying information; remembering or using facts or ideas.

Demonstration - showing, as opposed to telling, how to do something by manipulating appropriate materials and equipment.

Entering Competencies - skills and knowledge that trainees must possess before they are ready to learn the behavior specified in the objective.

Evaluation - the systematic process of collecting, analyzing, and preparing information for the purposes of decision-making. The functions of evaluation in training programs are to determine existing capabilities of employees, to provide feedback to trainees, to practice using a new skill and to determine (or certify) the preparation of a trainee to do a particular job.

Guided Discussion - a sharing of ideas and opinions in order to arrive at a mutually acceptable decision or solution to a problem.

Individualized Instruction - a means of bringing instruction under some aspect of learner control.

Instruction - external conditions arranged to help the student learn.

Instructional Activities - activities an instructor plans and arranges to help students learn.

Instructional Approach - the sequence of activities which an instructor uses to teach a lesson.

Instructional Design - the systematic process of specifying the goals and means of instruction. Included are the stages of objectives specification, evaluation design, method selection, and lesson planning.

Instructional Method - how content is taught.

Instructional Objective - a statement that describes an intended outcome of instruction in terms of learner behavior. It describes what a specific group or class of students should be able to do under specific conditions and how well it must be done.

Instructional Strategy - a prescriptive statement identifying the most appropriate instructional methods and learning activities for a specific type of desired performance.

IPW (Instructional Package Worksheet) - describes in detail and in order what must be done in order to teach a single objective.

IRIS (Instructional Resources Information System) - is an automated information system managed by EPA Instructional Resources Center which acquires, reviews, indexes and announces both print and non-print instructional materials.

Job - the occupational title or position held by an employee.

Job Description - a statement outlining areas of responsibility (duties) of a given position.

Learning - involves a more or less permanent change in the ability of the person to do something not previously possible.

Learning Activities - things learners do to help them learn.

Lecture - uninterrupted speech by which one presents information to others.

Lesson - instruction which (usually) encompasses a single instructional objective. A set of lessons on related objectives comprise a unit or a module of a unit.

Media - means or methods of presenting information aurally and/or visually.

Medium of Instruction - a channel of communication through which instruction is presented to the learner.

Motivation - the process of directing, focusing, and energizing behavior toward the accomplishment of specific goals.

Problem - a discrepancy or deficiency between the way things are and the way things ought to be.

Psychomotor Behavior - physical actions, speed or agility; the performance of a particular body movement.

Rating Scale - a list of skills or tasks, but with each so carefully defined as to permit the evaluator to judge the relative quality of the performance.

Resources - anything an instructor or trainee uses during instruction as a resource.

Task - is one of the skills or operations which belong to a specific duty or area of responsibility. Each task usually consists of specific and distinct steps for its completion.

Task Analysis - the act of dividing a duty into all of its components. It results in a list of everything an employee must do to advance the work to completion.

Unit - instruction on a set of related objectives, each of which is taught in a single lesson.

ADDENDUM B

**Other U.S. Environmental Protection Agency
Instructional Support Services and Materials**

INSTRUCTIONAL RESOURCES CENTER

The U.S. EPA maintains an Instructional Resources Center in Columbus, Ohio. A primary objective is the compilation and dissemination of information about water quality and pesticide instructional materials available to interested persons. The "Instructional Resources Center Bulletin" is designed as the communications link between the Center and persons involved in environmental education and training. If you wish to receive free copies of the annual bulletin, send your name, position title, organization or institution or agency name, mailing address and phone number to:

IRC Bulletin
The Ohio State University
1200 Chambers Road
Columbus, Ohio 43212

INSTRUCTIONAL MATERIALS CATALOG

Several audiovisual units and course packages are available for rent from U.S. EPA, the "Water Quality Control Instructional Materials" catalog describes slide/tape units, 16mm films, videocassettes and course packages that can be borrowed. If you wish to obtain copies of catalogs, please send address information to:

Instructional Resources Center
The Ohio State University
1200 Chambers Road
Columbus, Ohio 43212

INSTRUCTIONAL RESOURCES INFORMATION SYSTEM

The Instructional Resources Information System (IRIS) is a computer-based information system. It currently lists information about 10,000 printed or audiovisual water quality and pesticide instructional resources available from various individuals, state and federal government agencies, educational institutions and commercial companies throughout the country. For more information about this system, write to:

U.S. EPA Instructional Resources Center
The Ohio State University
1200 Chambers Road
Columbus, Ohio 43212

**INSTRUCTIONAL SUPPORT PACKAGES
for
TRAINING ENVIRONMENTAL PROFESSIONALS**

The U.S. EPA has developed instructional packages for several technical courses of interest to water, wastewater and land management personnel. Each package consists of a course manual, a staff guide and visual or audiovisual instructional aids for each topic. The printed manual are available through EPA's Instructional Resource Information System (IRIS) and/or the National Technical Information Service (NTIS). Instructional aids for teaching the topics are available for purchase from the EPA IRC.

Following is a description of the courses for which instructional packages are currently available. The format of the manuals facilitates selection and presentation of those topics of interest to a particular student or group of students.

For more information about purchasing any of these materials, contact:

EPA Instructional Resources Center
The Ohio State University
1200 Chambers Road
Columbus, Ohio 43212

Self-Monitoring Procedures: Basic Laboratory Skills

For:

Treatment plant personnel who are required to monitor effluent discharges and who have had little or no previous experience in laboratory work.

Topics:

Review of basic mathematics including the metric system, formulas and percentage; basic chemical laboratory operations such as weighing techniques, use of equipment and preparation of reagents; basic microbiological laboratory operations. Emphasis is on practice of skills.

Time:

Seventeen lessons ranging from 0.5 to 3.0 hours. Total instruction time is about 38 hours.

**Effluent Monitoring Procedures:
Basic Parameters for Municipal Wastewaters**

For:

Municipal treatment plant personnel who are required to sample, measure and analyze their discharges and who have had little or no previous experience in laboratory work.

Topics:

Open Channel Flow Measurement, Biochemical Oxygen Demand, Dissolved Oxygen, pH, Fecal Coliform by MPN and MF methods, Total Residual Chlorine, Suspended and Settleable Solids, Reporting Data. Emphasis is on laboratory practice.

Time:

Eighteen lessons ranging from 0.5 to 7.5 hours. Total instruction time is 30 to 45 hours.

Effluent Monitoring Procedures: Metals Analysis

For:

Municipal treatment plant personnel who are responsible for performing metal analysis and have had little or no experience in laboratory work.

Topics:

Various metals are used as examples of six methods used to determine metals: Boron, colorimetry; Calcium, volumetric; Copper, Magnesium, Manganese, Zinc, direct aspiration atomic absorption; Lead, extraction followed by atomic absorption; Mercury, flameless atomic absorption; Potassium and Sodium, flame photometry. Emphasis is on laboratory practice.

Time:

Seven lessons ranging from 2.5 to 5 hours. Total instruction time is 20 to 23 hours.

Effluent Monitoring Procedures: Nutrients

For:

Municipal treatment plant personnel who are responsible for performing nutrient analyses and who have had little or no experience in laboratory work.

Topics:

Phosphorus, Kjeldahl Nitrogen, Ammonia, Organic Nitrogen (by difference), Nitrate and Nitrite Nitrogen by Cadmium Reduction. Also Chemical Oxygen Demand and Oil and Grease. Emphasis is on laboratory practice.

Time:

Nine lessons ranging from 1.0 to 7.0 hours. Total instruction time is 27 to 33.5 hours.

**Methods for Determination of Chemical Contaminates
in Drinking Water**

For:

Chemists and technicians with little or no experience in chemical procedures required to monitor drinking water.

Topics:

Sampling, Statistics, Quality Control, Safety, Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver, Fluoride, Nitrate, Organics (chlorinated hydrocarbons, chlorophenoxys, trihalomethanes), Chlorine and Turbidity. Representative methods can be selected for the laboratory practice sessions.

Time:

Fourteen lessons ranging from 1.0 to 3.8 hours. Total instruction time is 26 to 49 hours.

**Determination of Residual Chlorine and Turbidity
in Drinking Water**

For:

Chemists and technicians with little or no experience in chemical procedures required to monitor drinking water.

Topics:

Compliance Requirements, Total Residual Chlorine and Turbidity. Emphasis is on laboratory practice.

Time:

Five lessons ranging from 0.75 to 1.5 hours. Total instruction time is 5 hours.

Inorganic Analyses in Water Quality Control Programs

For:

Chemists and technicians with chemical laboratory experience, 1 year experience, 1 year of college level inorganic chemistry and 1 semester of quantitative analysis (or equivalent).

Topics:

Sample Handling, Compliance Methodology, Safety, Analytical Techniques, Volumetric Analyses, Precision, Accuracy, Quality Assurance Programs, Acidity and Alkalinity, Total Residual Chlorine, Fluoride, Hardness, Nitrate and Nitrite Nitrogen, Total Phosphorus, Total and Suspended Solids, Specific Conductance, Turbidity. Emphasis is on laboratory practice.

Time:

Nineteen lessons ranging from 0.5 to 5.25 hours. Total instruction time is 30 hours.

Organic Analysis in Water Quality Control Programs

For:

Chemists and technicians with chemical laboratory experience, 1 year of college level organic chemistry and 1 semester of quantitative analysis (or equivalent).

Topics:

Sample Handling, Compliance Methodology, Safety, Control of Analytical Performance, Spectrophotometer and Calibration Graphs, Gas Chromatography, Dissolved Oxygen, Biochemical Oxygen Demand, Chemical Oxygen Demand, Chlorinated Hydrocarbons, Total Organic Carbon, Total Kjeldahl and Organic Nitrogen, Oil and Grease, Phenolics, Polychlorinated Biphenyls, Surfactants. Emphasis is on laboratory practice.

Time:

Twenty-one lessons ranging from 0.5 to 3.25 hours. Total instruction time is 26 to 30 hours.

Bacteriological Methods in Water Quality Control Programs

For:

Bacteriologists and technicians with bacteriological laboratory experience including sample inoculations, transfers, media preparation and handling, and related skills.

Topics:

Compliance Methodology; Chlorine Determinations and Turbidity; Bacterial Indicators; Equipment, Media and Solutions, Sample Volumes, Sample Collection and Test Procedures for both the MPN and MF methods; Statistics and Geometric Means. Emphasis is on laboratory practice.

Time:

Twenty-one lessons ranging from 0.75 to 4.0 hours. Total instruction time is 28.75 hours.

Land Application of Wastes

For:

Engineers, scientists, waste management specialists and other professionals with at least the equivalent of an undergraduate degree in engineering, agriculture or a related discipline.

Topics:

Course integrates pertinent information from sanitary and environmental engineering, agronomy, soil science, agricultural engineering, economics, and law as applicable to utilizing land for the application of various types of wastes. Lessons are: Soil as a Treatment Medium, Site Evaluation Procedures, Design Approaches, Social Factors, Vegetative Cover, Alternative Systems, Monitoring, Nitrogen Management, Phosphorus Management, Toxic Element Interactions, Organics, Legal Aspects, Crop Selection, Non-crop Uses, Costing Procedure, Water Management and Climate Effects.

Time:

Twenty-one modules ranging from 0.5 to 3.0 hours. Designed for a workshop setting of about 40 hour duration.

Note:

Materials were developed by a grantee.

Erosion and Sediment Control, Audiovisual Training Program

For:

Those responsible for erosion and sediment control, management, inspections or State standard development or support.

Topics:

Erosion and sediment control, Soils, Rainfall-runoff relationships, Erosion and sedimentation, Plant materials, Control of runoff during construction, Vegetative soil stabilization, Stream erosion control, Temporary soil stabilization, Sediment from construction, Control planning, Wooded sites, Roles and responsibilities.

Time:

Thirteen modules, self-paced. The package is designed for both self-study and for group presentation.

Note:

Materials were developed by a contractor.

CURRICULUM GUIDES

Curriculum guides for training water quality control personnel have been developed by various institutions and are available for use and adaption by others. For further information about the following, contact the source cited.

A Two-Year Water Quality Monitoring Curriculum

Source:

Ulster County Community College
Attn: Professor Richard Glazer's Office
Stone Ridge, New York 12484

Wastewater Technology: A Two-Year Post-High School Instructional Program

Source:

Charles County Community College
Attn: Mr. William Engel's Office
P.O. Box 910
La Plata, Maryland 20646

Wastewater Engineering Technology Program

Source:

Clemson University
Attn: Dr. Joseph Allen's Office
Clemson, South Carolina 29631

Note: This is a four year program.

Bachelor of Engineering Technology Curriculum in Water Quality Management

Source:

Pennsylvania State University
Attn: Dr. Charles Cole's Office
Capitol Campus, W 261
Middletown, Pennsylvania 17057

Note: This is a two plus two or a four year program.

ADDENDUM C

Blank Forms

INDEX TO BLANK FORMS

Task Detailing Sheet 1 page

Instructional Package Worksheet 1 page

Objectives Score Sheet 1 page

Presentation Rating Scale 1 page

TASK DETAILING SHEET

A. Write Job Title _____

B. Write Task _____

Complete steps C-F in the space below.

C. List the specific steps required to perform the task.

D. Check each step which needs to be taught.

E. Indicate whether the checked steps primarily involve cognitive, affective, or psychomotor behavior.

F. For a cognitive behavior, indicate the appropriate level of performance:

Knowledge - ability to recall information or procedures.

Comprehension - ability to explain information or procedures.

Application - ability to use information or procedures to do something.

Problem-Solving - ability to develop new information or procedures.

Steps Required to Perform Task	Needs to be Taught	Type of Behavior Cognitive, Affect tive, Psychomotor	Level of Cognitive Behavior: Know., Comp., Appl., P.S.
-----------------------------------	--------------------------	--	--

1.

2.

3.

4.

5.

6.

INSTRUCTIONAL PACKAGE WORKSHEET

CURRICULUM:

COURSE:

UNIT:

LESSON:

Estimated time:

Entering Competencies:

Justification:

Objective:

Evaluation Activities:

Resources:

Instructional Approach:

OBJECTIVES SCORE SHEET

Rate the objectives written by another participant according to the outline below.

1. State the behavioral term used. _____

Explicit? _____ Yes _____ No

A better term would be _____

2. What are the conditions under which the behavior is to be performed?

Are the conditions clearly understandable? _____ Yes _____ No

Are they complete? _____ Yes _____ No

3. Is the level of acceptable performance given?

_____ Yes _____ No

Write it here. _____

Does it demonstrate that the student has mastered the objective?

_____ Yes _____ No

A - Five "yes" answers - excellent

B - Three or four "yes" answers - on the right track; need practice.

C - Two or less "yes" answers - unsatisfactory; reread training material.

PRESENTATION RATING SCALE

Speaker _____ Topic _____

Reviewer _____ Date _____

This rating scale is designed to give the speaker an indication of the quality of his presentation skills. Circle the appropriate number that best represents your impression of this speaker's performance on each characteristic. Any comments which will help the speaker improve his performance in the future will be appreciated.

Presentation Rating Scale

	Good	Average	Poor
Organization			
-Clear introduction	3	2	1
-Logical organization	3	2	1
-Emphasized key points	3	2	1
-Allowed for student feedback	3	2	1
-Provided summary	3	2	1
Delivery Techniques			
-Sufficient volume	3	2	1
-Varied intonation and pace	3	2	1
-Showed interest in subject	3	2	1
-Relaxed posture	3	2	1
-No distracting mannerisms	3	2	1

If distracting mannerisms were used, what were they?

Any general comments which might help the speaker improve his presentation ability in the future may be made below.

ADDENDUM D

Figures for Use in the Workshop

INDEX TO FIGURES

UNIT I: Lesson 1:

-Fig. 1.1 - Unit One Outline

Lesson 2:

-Fig. 1.2 - Instructional Package Worksheet

Lesson 3:

-Fig. 1.3 - The Systematic Approach to Instruction

UNIT II: Lesson 1:

- Fig. 2.1 - Environmental Influence
 - 2.2 - Physical Environment
 - 2.3 - Psychological Environment
 - 2.4 - Planning Considerations
 - 2.5 - Managing Techniques
 - 2.6 - Lesson Plan
 - 2.7 - Don't Talk Too Much
 - 2.8 - Divide Talks
 - 2.9 - Frequent Breaks
 - 2.10 - Comfortable Room
 - 2.11 - Arrange Furniture
 - 2.12 - Clean Room
 - 2.13 - Handouts
 - 2.14 - Provide Handouts
 - 2.15 - Training Aids
 - 2.16 - Pre-draw
 - 2.17 - Eliminate Distractions

Lesson 2:

- Fig. 2.18 - Spoken Delivery
 - 2.19 - Non-Distracting Delivery
 - 2.20 - Organized Delivery

Lesson 3:

- Fig. 2.21 - Questions: Student
 - 2.22 - Questions: Instructor

UNIT III: Lesson 1:

-Fig. 3.1 - Define the Problem

Lesson 2:

- Fig. 3.2 - Problem #1
- 3.3 - Problem Definition
- 3.4 - Problem #2

Lesson 3:

- Fig. 3.5 - Categories of Problems
- 3.6 - Skill or Knowledge Problems
- 3.7 - Motivation or Incentive Problems
- 3.8 - Environmental Problems

UNIT IV: Lesson 1:

- Fig. 4.1 - Analyze the Tasks
- 4.2 - Job
- 4.3 - Job Description
- 4.4 - Task and Step
- 4.5 - Task Analysis

Lesson 2:

- Fig. 4.6 - Affective Behavior
- 4.7 - Psychomotor Behavior
- 4.8 - Cognitive Behavior
- 4.9 - Cognitive-knowledge
- 4.10 - Cognitive-comprehension
- 4.11 - Cognitive-application
- 4.12 - Cognitive-problem solving

UNIT V: Lesson 1:

- Fig. 5.1 - Instructional Objectives
- 5.2 - Instructional Objective: Definition
- 5.3 - Vague Terms
- 5.4 - Explicit Terms

UNIT VI: Lesson 1:

- Fig. 6.1 - Evaluation
- 6.2 - Compare Similar Things
- 6.3 - Compare Against a Standard
- 6.4 - Compare Before and After
- 6.5 - Employee Capabilities
- 6.6 - Feedback
- 6.7 - Practice
- 6.8 - Determine Preparation
- 6.9 - Evaluations Differ According to:
- 6.10 - Example Checklist
- 6.11 - Example Rating Scale

UNIT VII: Lesson 1:

- Fig. 7.1 - Select Instructional Methods and Media
- 7.2 - Instructional Methods - Definition

Lesson 2:

- Fig. 7.3 - Lecture
- 7.4 - Demonstration
- 7.5 - Guided Discussion
- 7.6 - Individualized Instruction

UNIT VIII: Lesson 2:

- Fig. 8.1 - Medium of Instruction - Definition

Lesson 4

- 8.2 - IRIS
- 8.3 - IRIS Abstract Contents
- 8.4 - Community Resources

UNIT IX: Lesson 1:

- Fig. 9.1 - Develop Instructional Strategies
- 9.2 - Instructional Package Worksheet
- 9.3 - Purpose of Lesson Planning
- 9.4 - Completing an IPW
- 9.5 - Instructional Resources
- 9.6 - Instructional Approach

UNIT X:

- None

UNIT XI:

- None

UNIT XII:

- Fig. 1.3 - The Instructional Development Process

ADDENDUM F

Overheads

UNIT ONE: INTRODUCTION

1. Introduction to the Qualities of Good Instruction
2. The Purpose of this Workshop
3. Systematic Approach to Instruction

INSTRUCTIONAL PACKAGE WORKSHEET

Estimated Time:

Entering Competencies:

Justification:

Objective:

Evaluation Activities:

Resources:

Instructional Approach:

THE INSTRUCTIONAL DEVELOPMENT PROCESS

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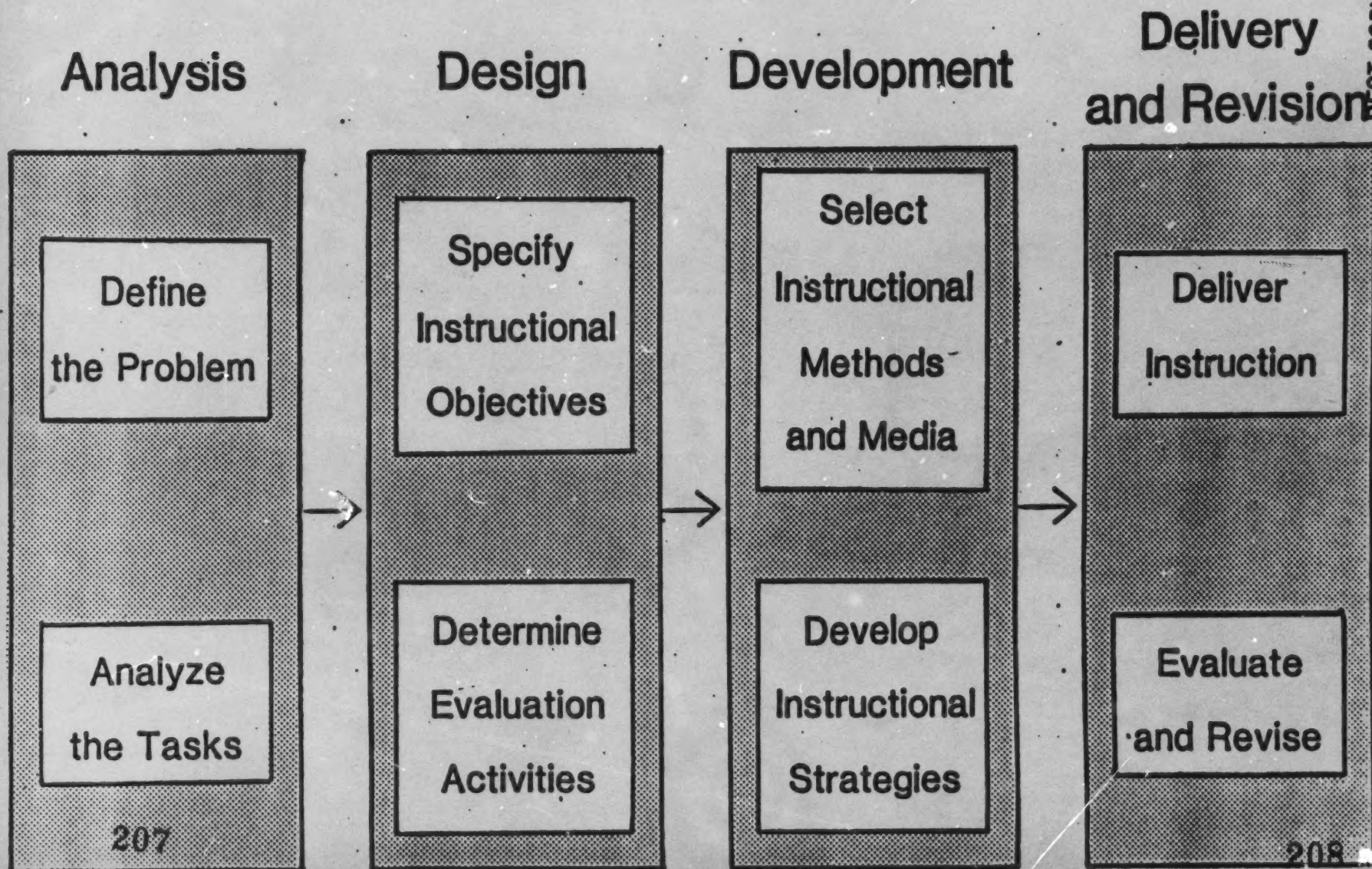


FIG 1.3 - The Systematic Approach to Instruction



Figure 2.1 / Environmental Influence

PHYSICAL ENVIRONMENT AND INSTRUCTION

Characteristic

Effect

-Poor Acoustics

-Can't hear instruction

-Loss of attention

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Figure 2.2 /Physical Environment

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PSYCHOLOGICAL ENVIRONMENT AND INSTRUCTION

Characteristic

Effect

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Figure 2.3/Psychological Environment

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CONSIDERATIONS WHEN PLANNING INSTRUCTION

- Selection of Methods and Media
- Rewards
- Class Schedule
- Degree of Formality

Figure 2.4/Planning Considerations

TECHNIQUES FOR MANAGING CLASS AND MAINTAINING ATTENTION

- Begin with overview
- Note progress
- Direct attention
- Maintain participation
- Appropriate pace and variety
- Move around classroom
- Counsel problem students
- Treat all students equally

USE LESSON PLAN



DON'T TALK TOO MUCH



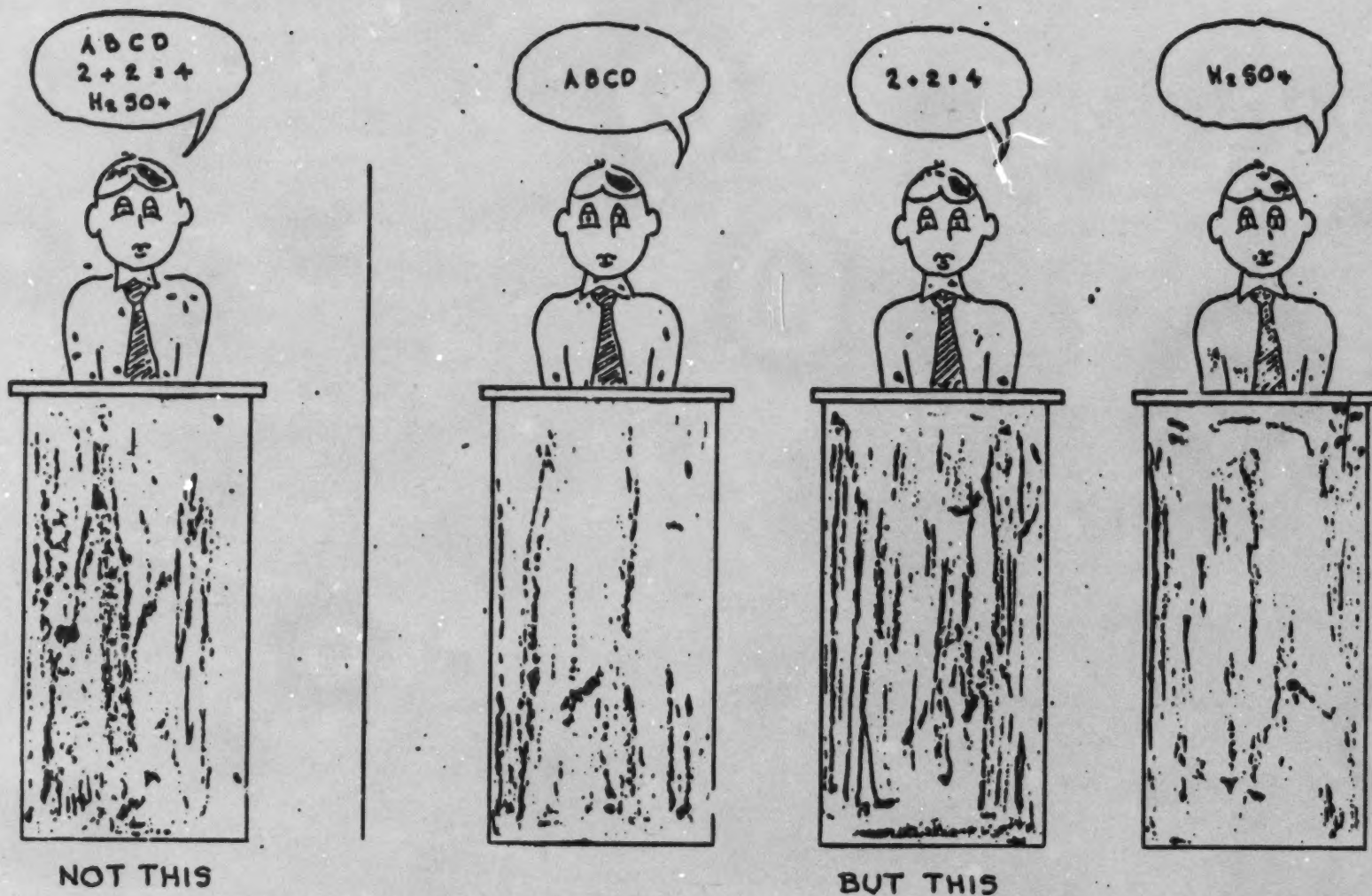
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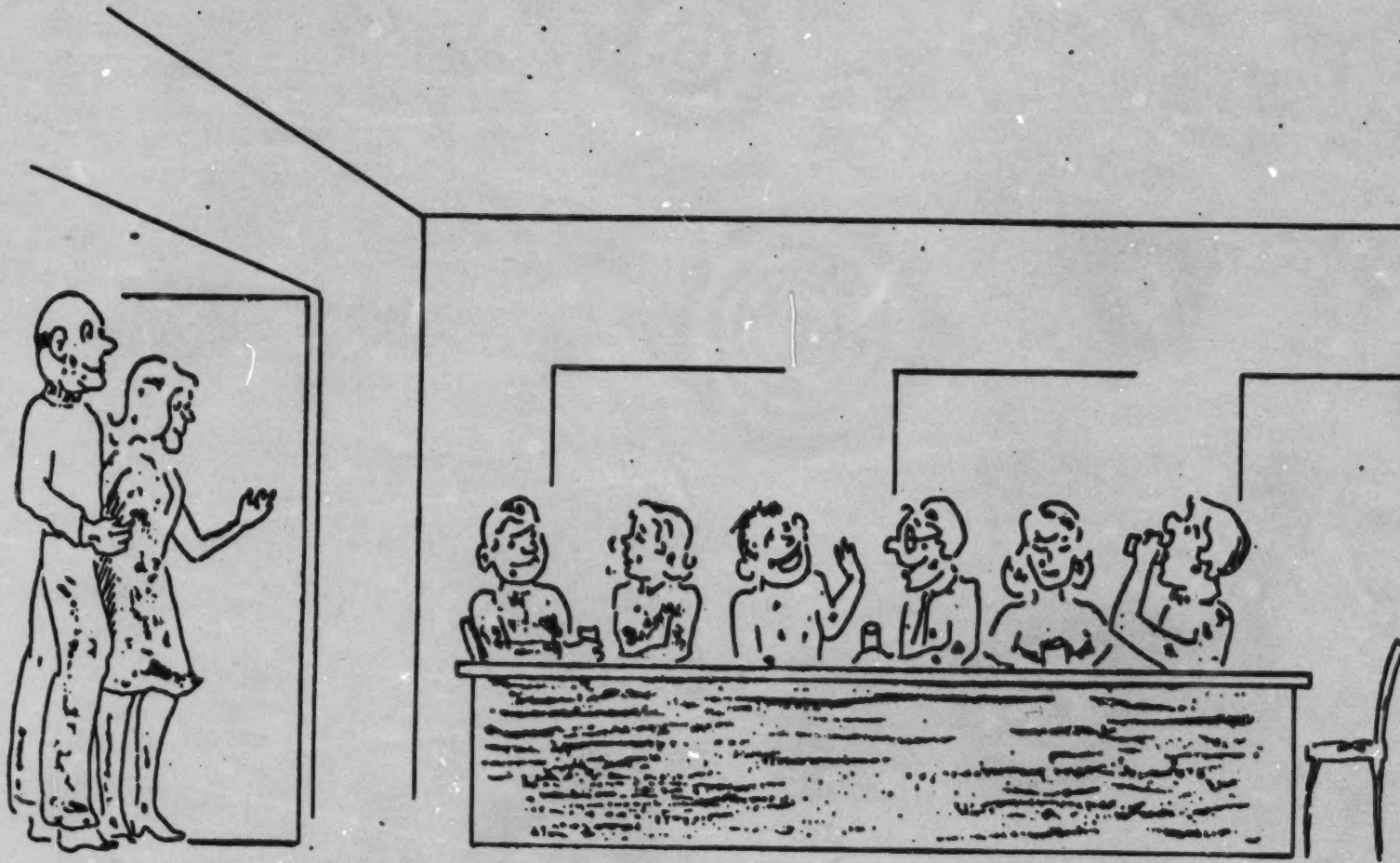
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Fig. 2.7 - Don't Talk Too Much

DIVIDE THEORETICAL TALKS



FREQUENT BREAKS

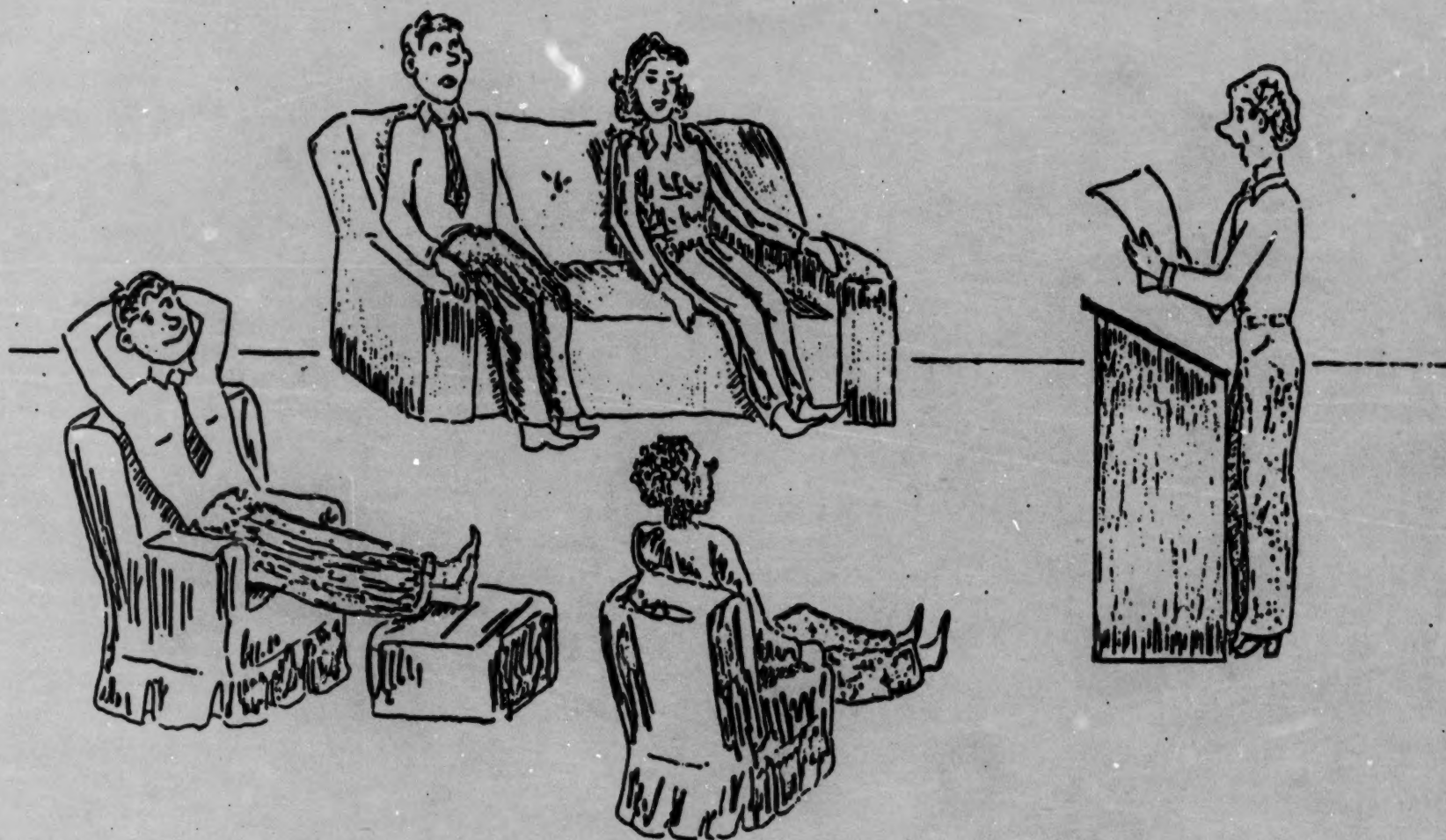


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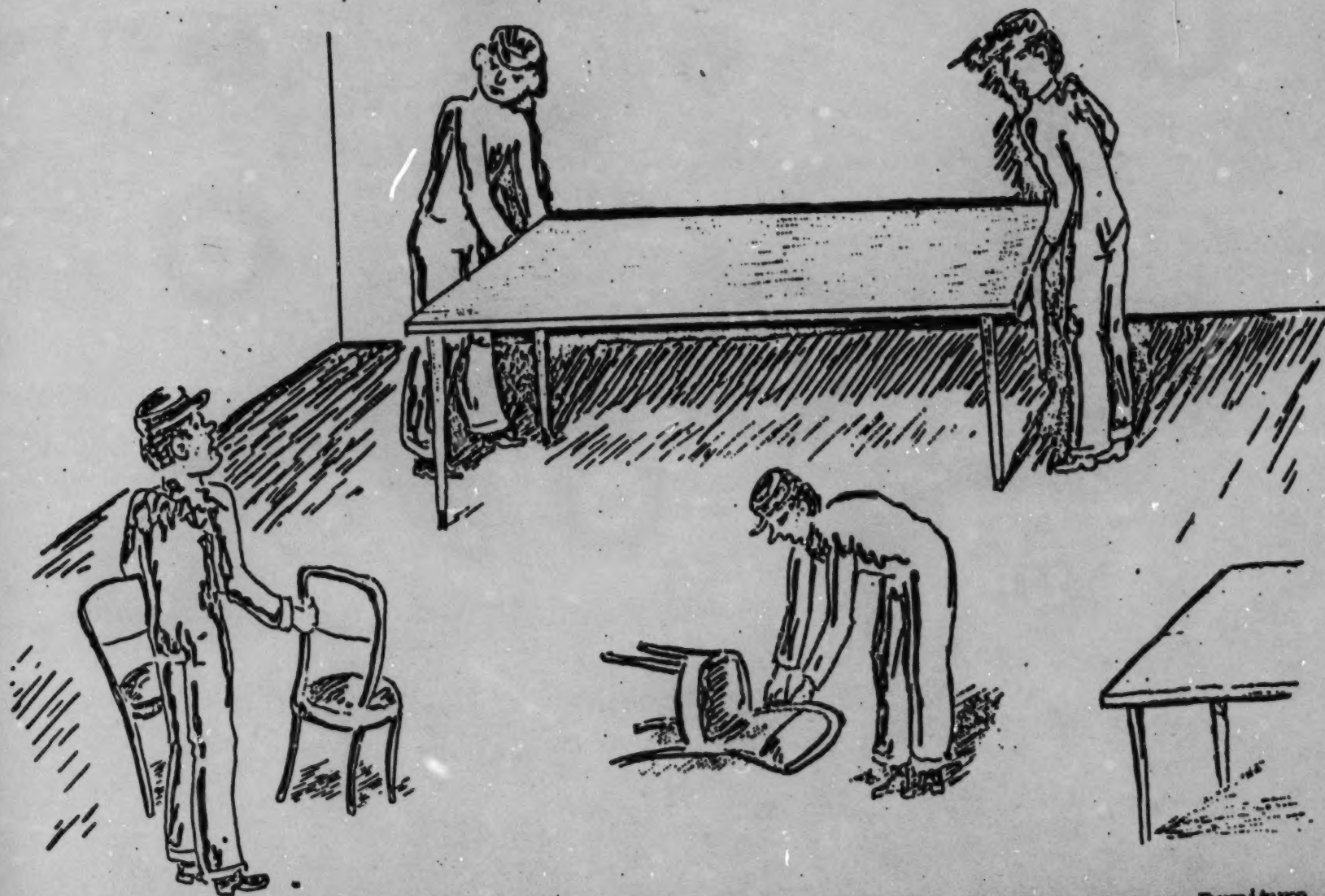
Fig 2.9- Frequent Breaks

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COMFORTABLE ROOM



PREARRANGE FURNITURE



227

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Fig. 2.11 - Arrange Furniture

CLEAN TABLES, CHAIRS

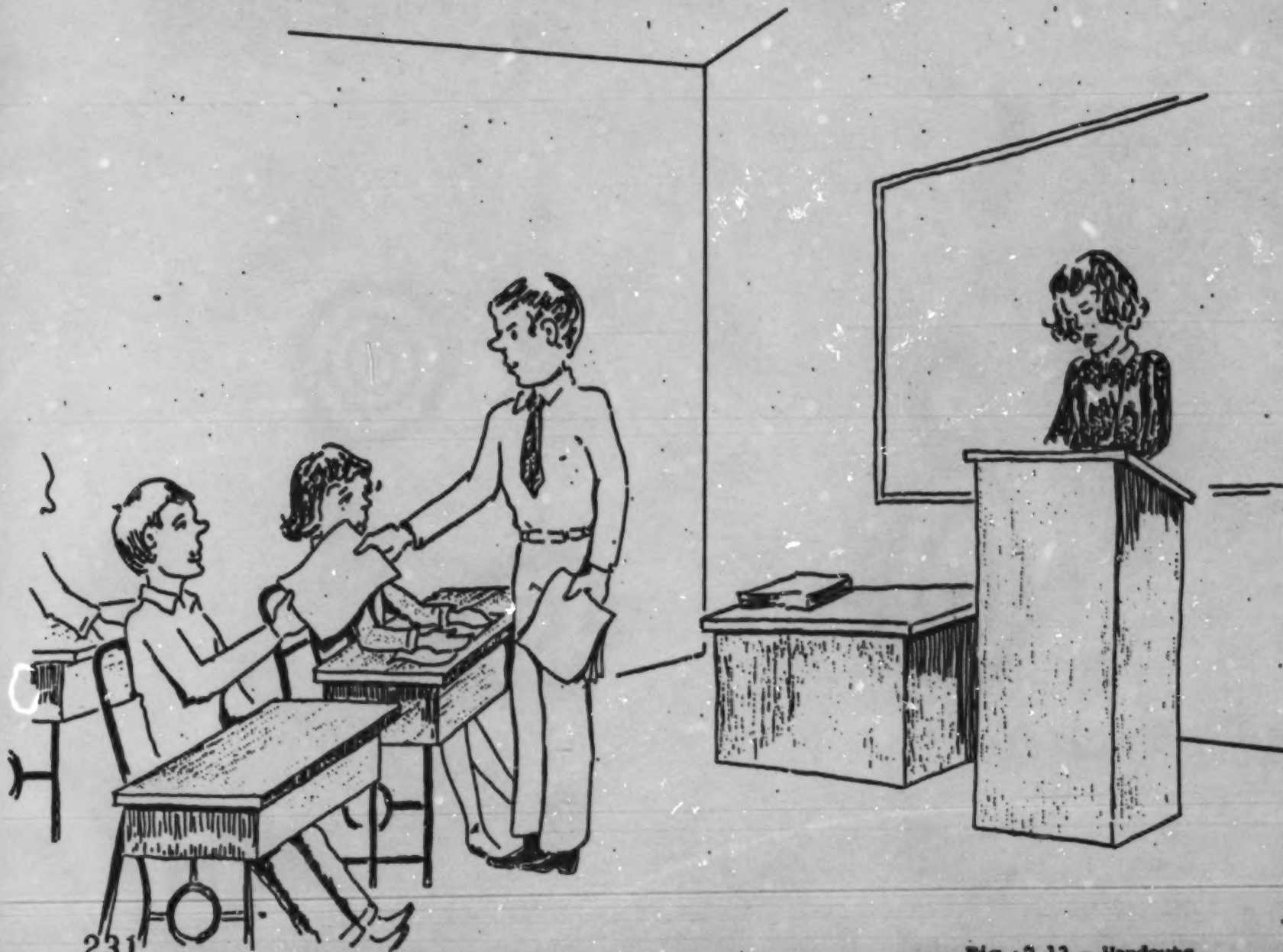


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Fig. 2.12 - Clean Room

HAND OUT MATERIALS BEFORE OR AFTER



PROVIDE HANDOUTS IF NEEDED

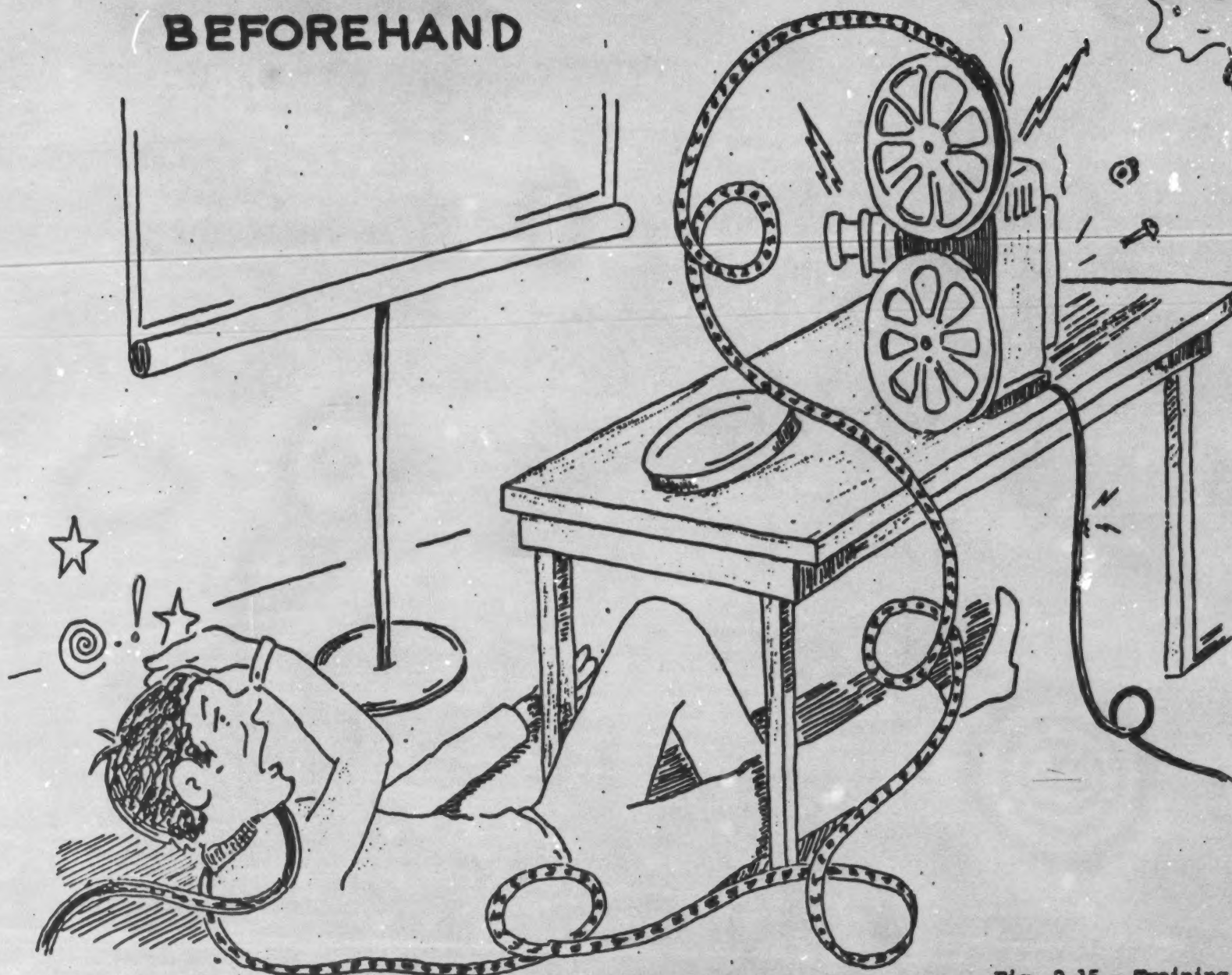


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Fig. 2.14 Provide Handouts

TEST TRAINING AIDS (BEFOREHAND)

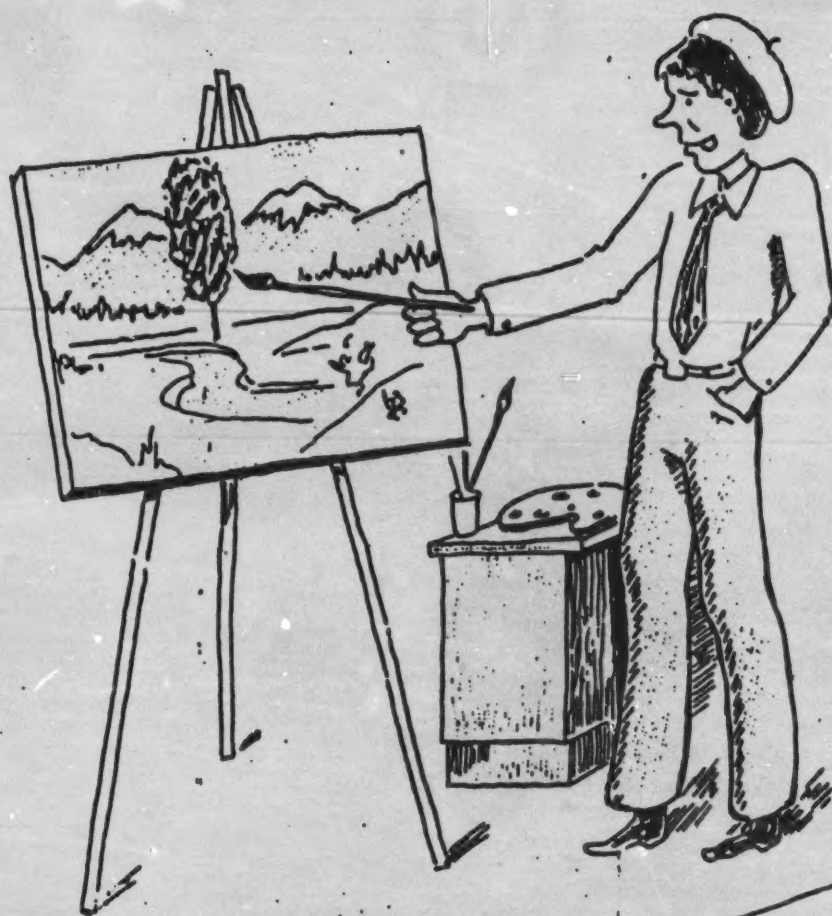


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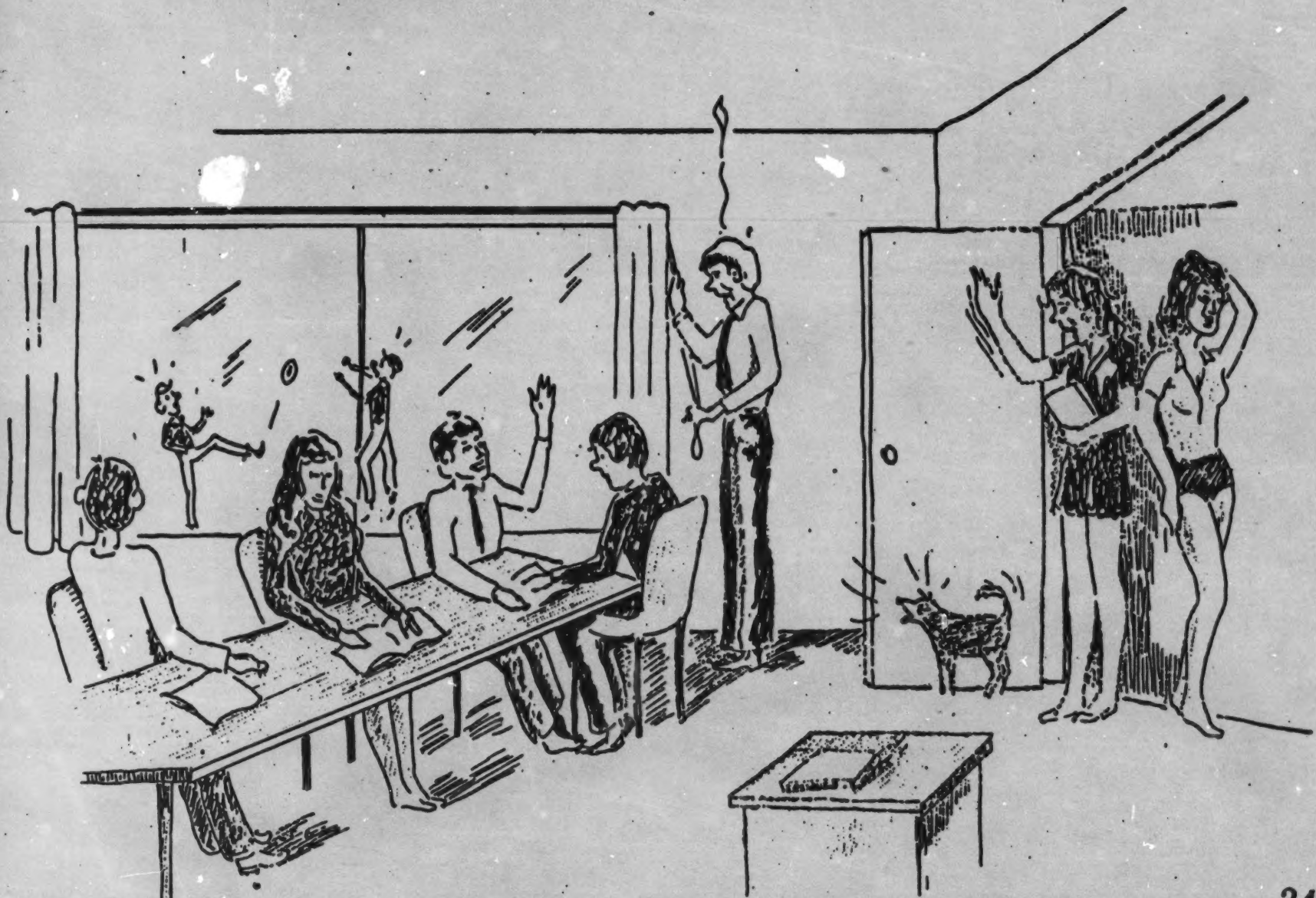
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Fig. 2.15 - Training Aids

PREDRAW OR SKETCH



ELIMINATE DISTRACTIONS



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Fig. 2.17 - Eliminate Distractions

I. SPOKEN DELIVERY

1. Eye Contact
2. Humor
3. Variety
4. Informality
5. Appropriate Language
6. Check Audience
7. Audience Participation
8. Enthusiasm

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II. NON-DISTRACTING DELIVERY

1. Poise
2. Organized Materials
3. Face Audience
4. Quiet Hands

I. ORGANIZED DELIVERY

- 1. Orientation**
- 2. Structure**
- 3. Emphasis**
- 4. Summary**

QUESTIONS AID THE STUDENT

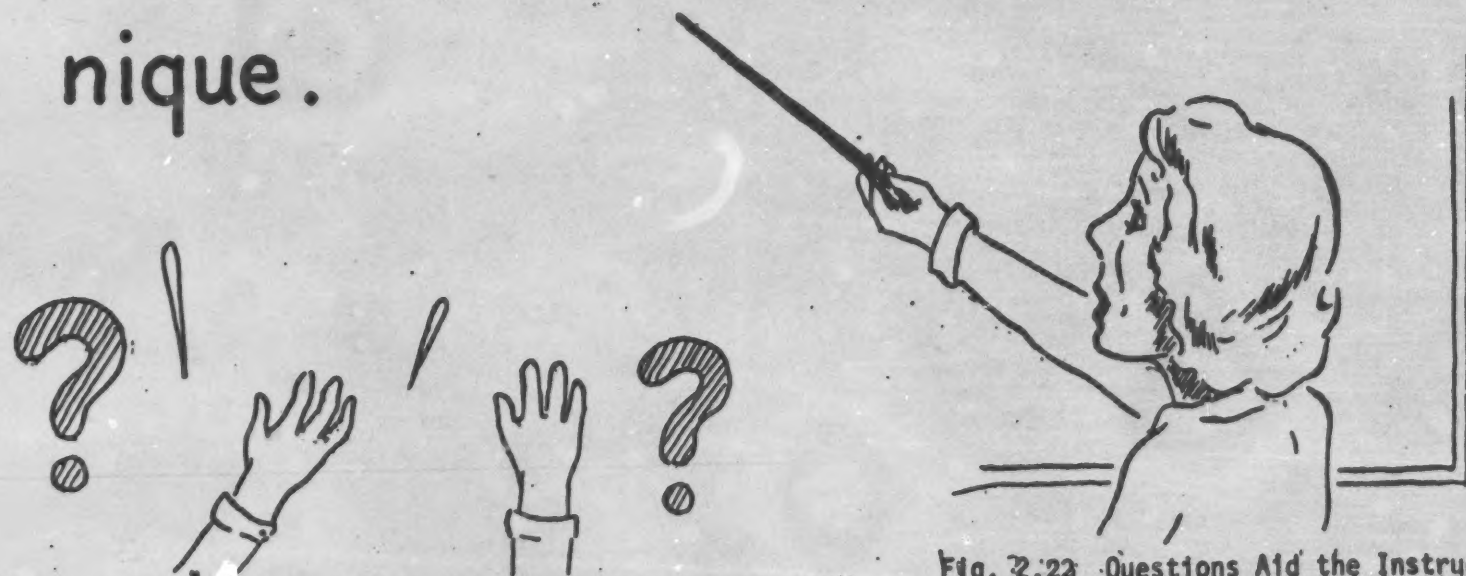
1. Alert him to the main points . . .
2. Require his participation
3. Reinforce his learning



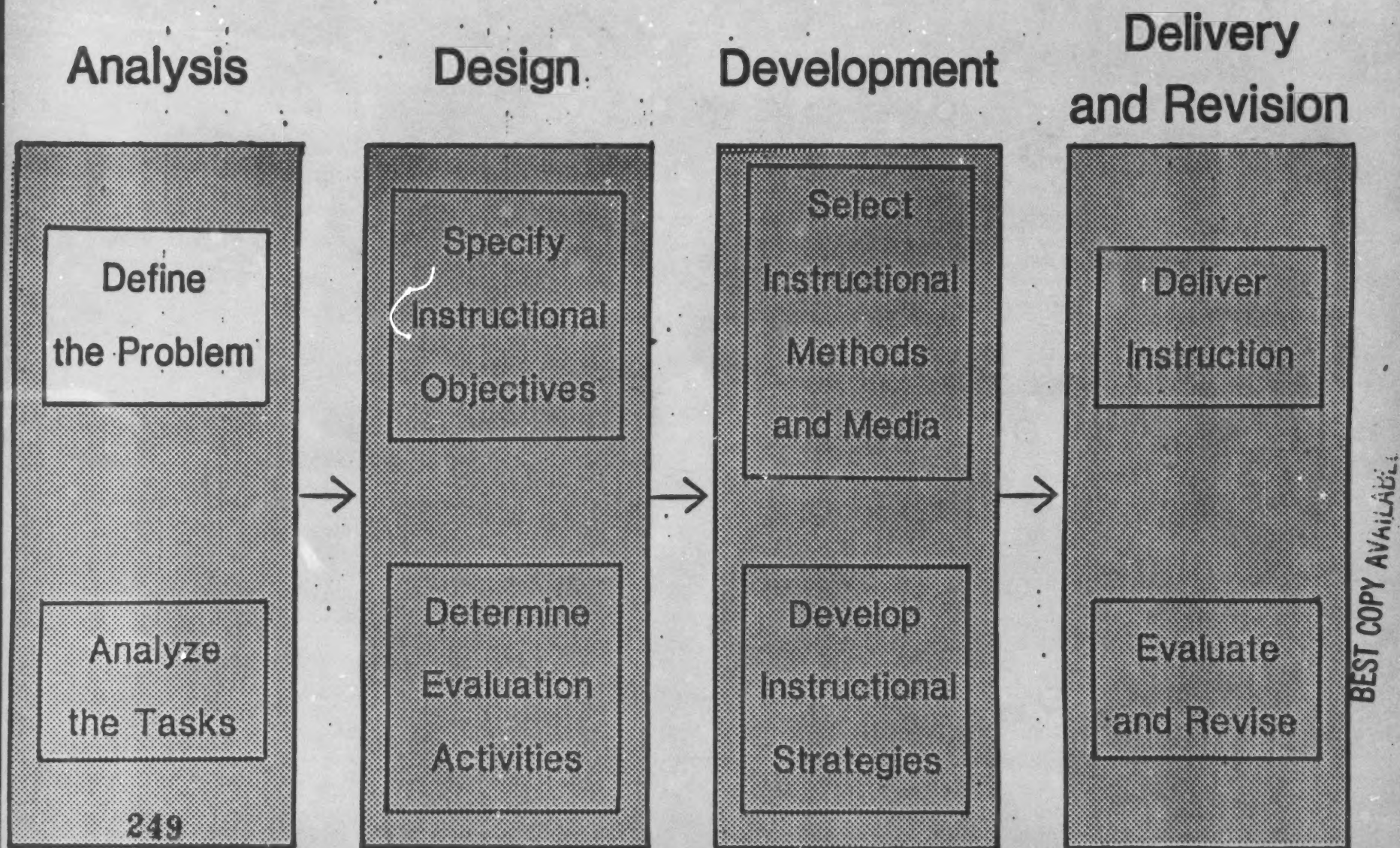
Fig. 2.21 Questions Aid the Student

QUESTIONS AID THE INSTRUCTOR

1. Serve as a participation technique.
2. Act as a feedback mechanism.
3. Are useful as a class control technique.



THE INSTRUCTIONAL DEVELOPMENT PROCESS



PROBLEM #1

Our office needs an in-service program to retrain Wastewater Treatment Plant Operators.

PROBLEM

A discrepancy or deficiency
between the way things are
and the way things ought to be

Figure 3.3/Problem Definition

PROBLEM #2

Our employees do not care very much
about the quality of their work.

CATEGORIES OF PROBLEMS

1. Lack of SKILL OR KNOWLEDGE
2. Lack of MOTIVATION OR INCENTIVE
3. ENVIRONMENTAL Constraints

Figure 3.5/Categories of Problems

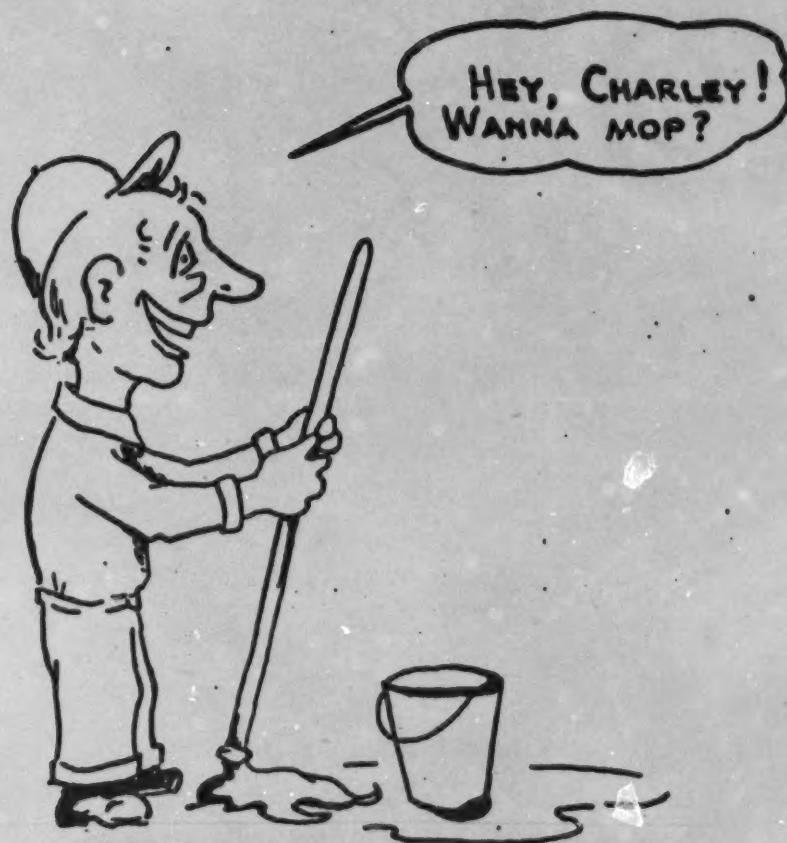
SKILL OR KNOWLEDGE PROBLEMS

Include all cases where people do not know what to do or how to do it.



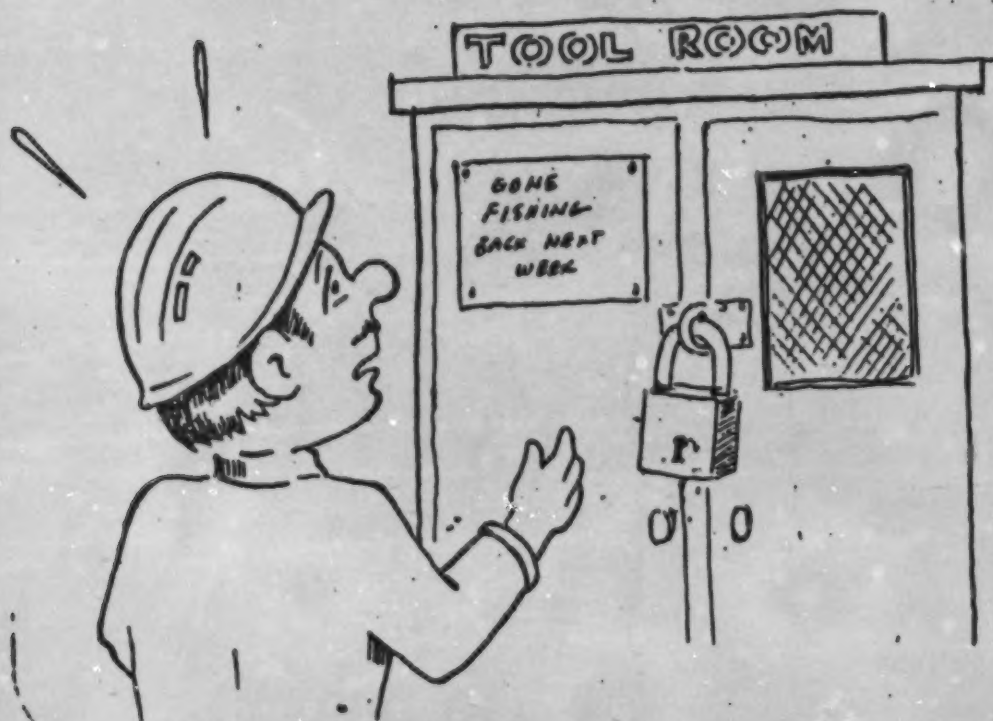
MOTIVATION OR INCENTIVE PROBLEMS

INCLUDE SITUATIONS WHERE PEOPLE
MAY KNOW HOW TO DO SOMETHING
BUT DO NOT WANT TO DO IT



ENVIRONMENTAL PROBLEMS

Involve situations where people know how to do something and want to do it but something about the work situation or organization will not let them perform effectively



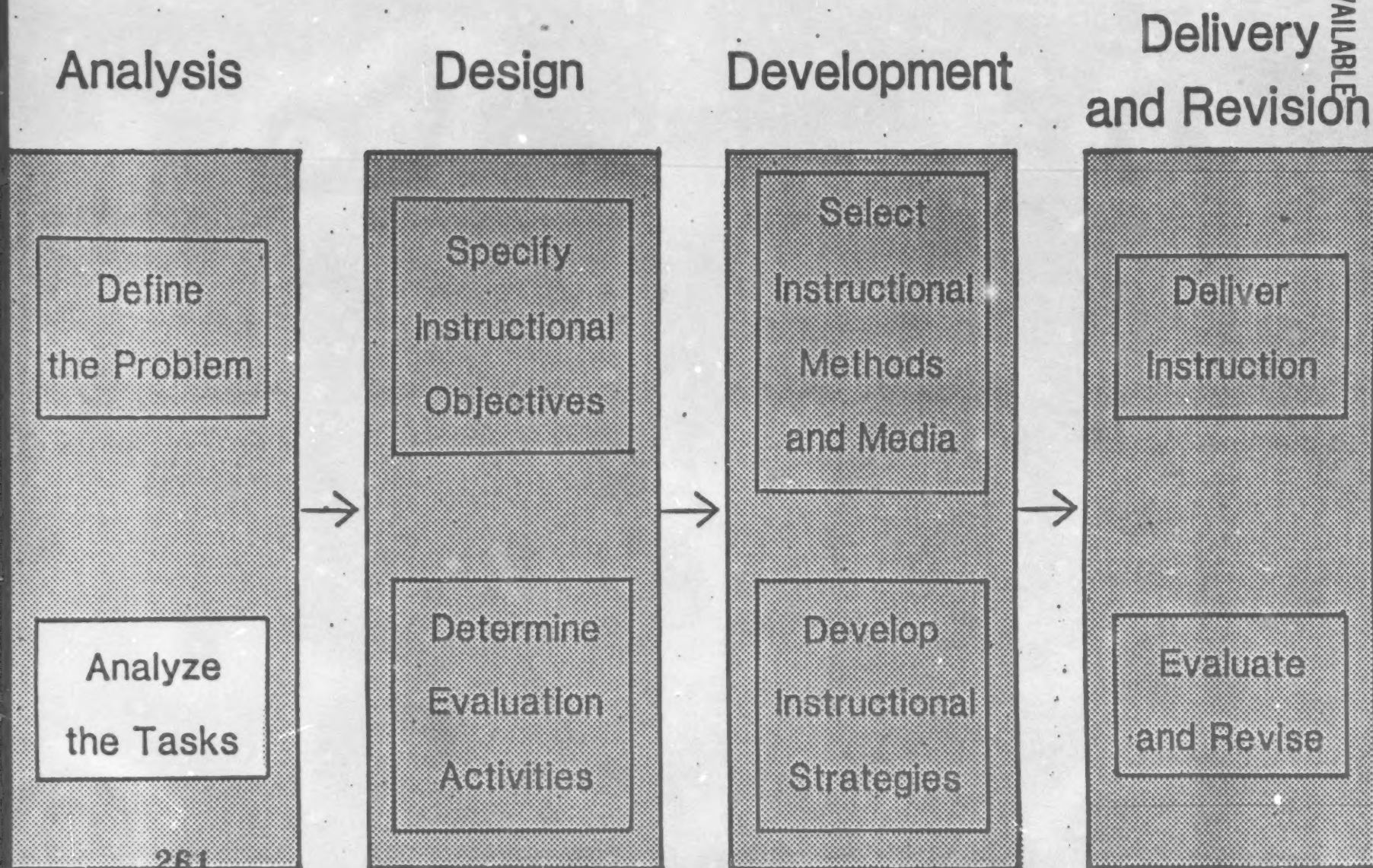
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Fig. 3.8 - Environmental Problems

THE INSTRUCTIONAL DEVELOPMENT PROCESS

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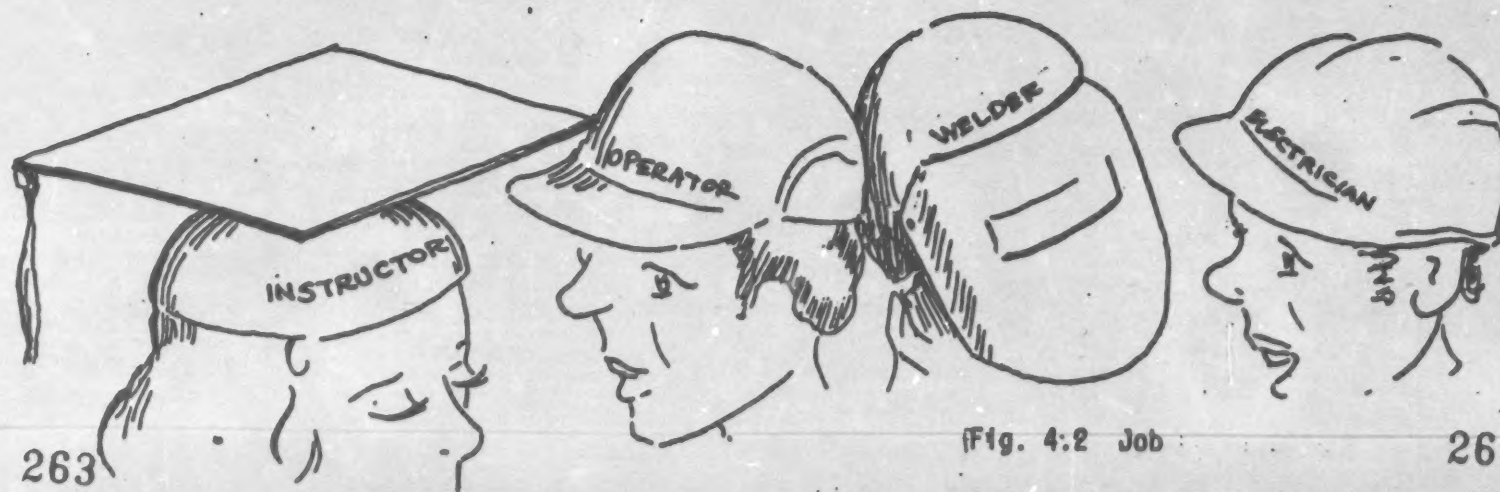


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Fig. 4.1 Analyze the Tasks

JOB

The occupational title or
position held by an employee



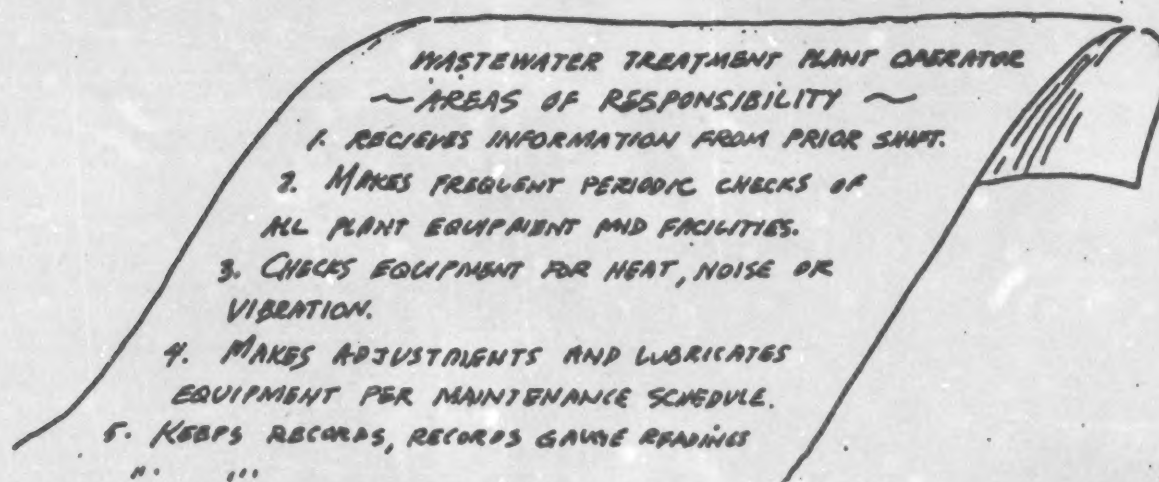
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(Fig. 4:2 Job

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JOB DESCRIPTION

A statement (or statements) outlining the areas of responsibilities (duties) of a given position

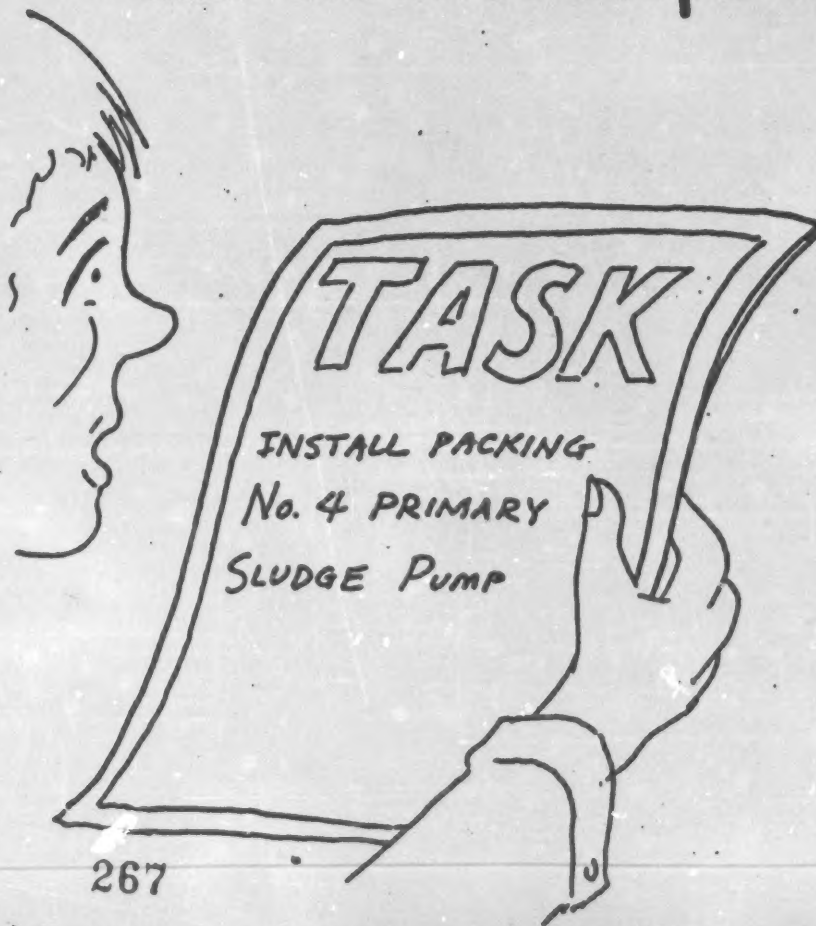


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TASK

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Each of the skills or operations which belong to a specific area of responsibility. Each task usually consists of specific and distinct steps for its completion.



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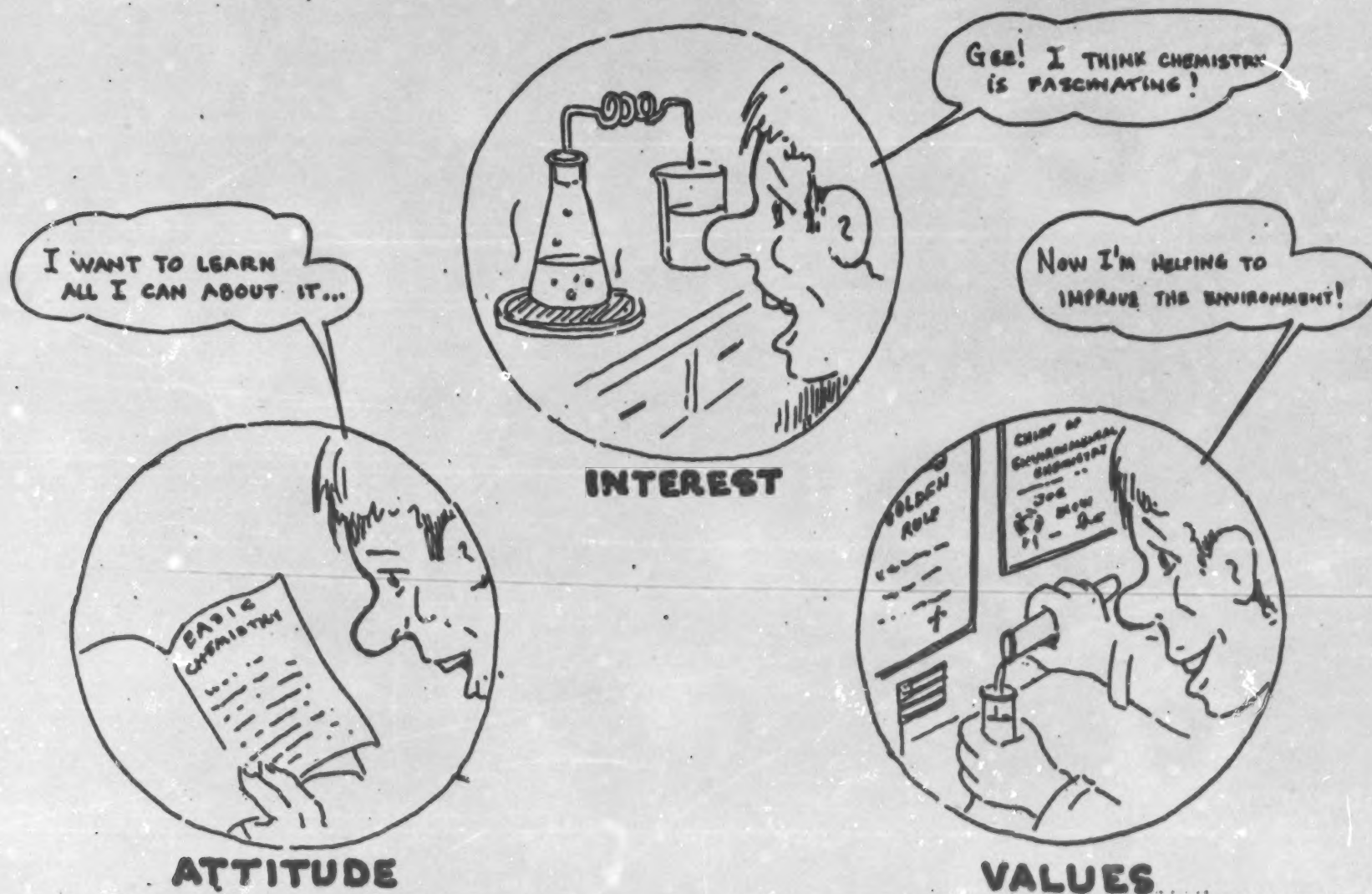
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TASK ANALYSIS

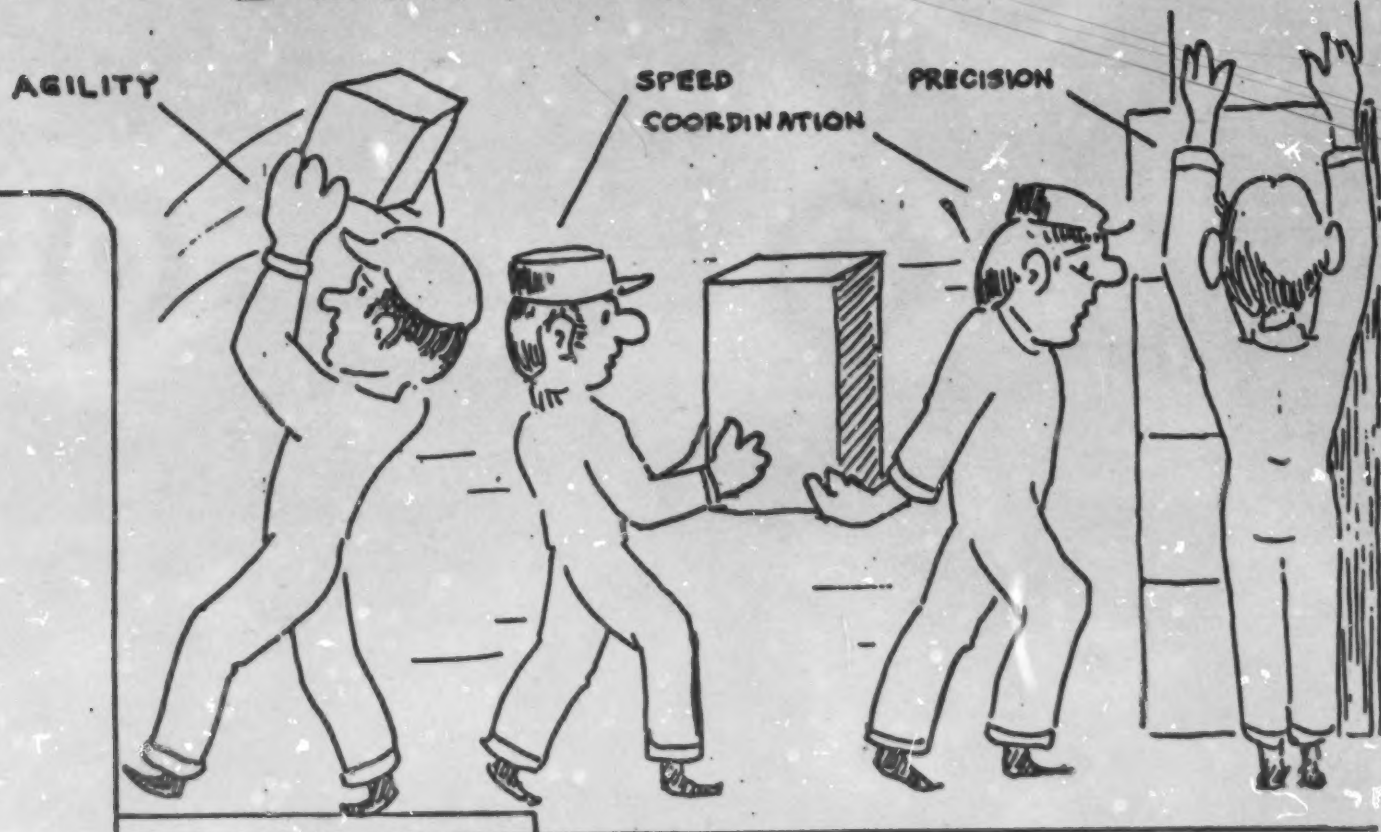
The act of dividing a duty into all its component tasks.

It results in a list of everything an employee must do to advance the work to completion.

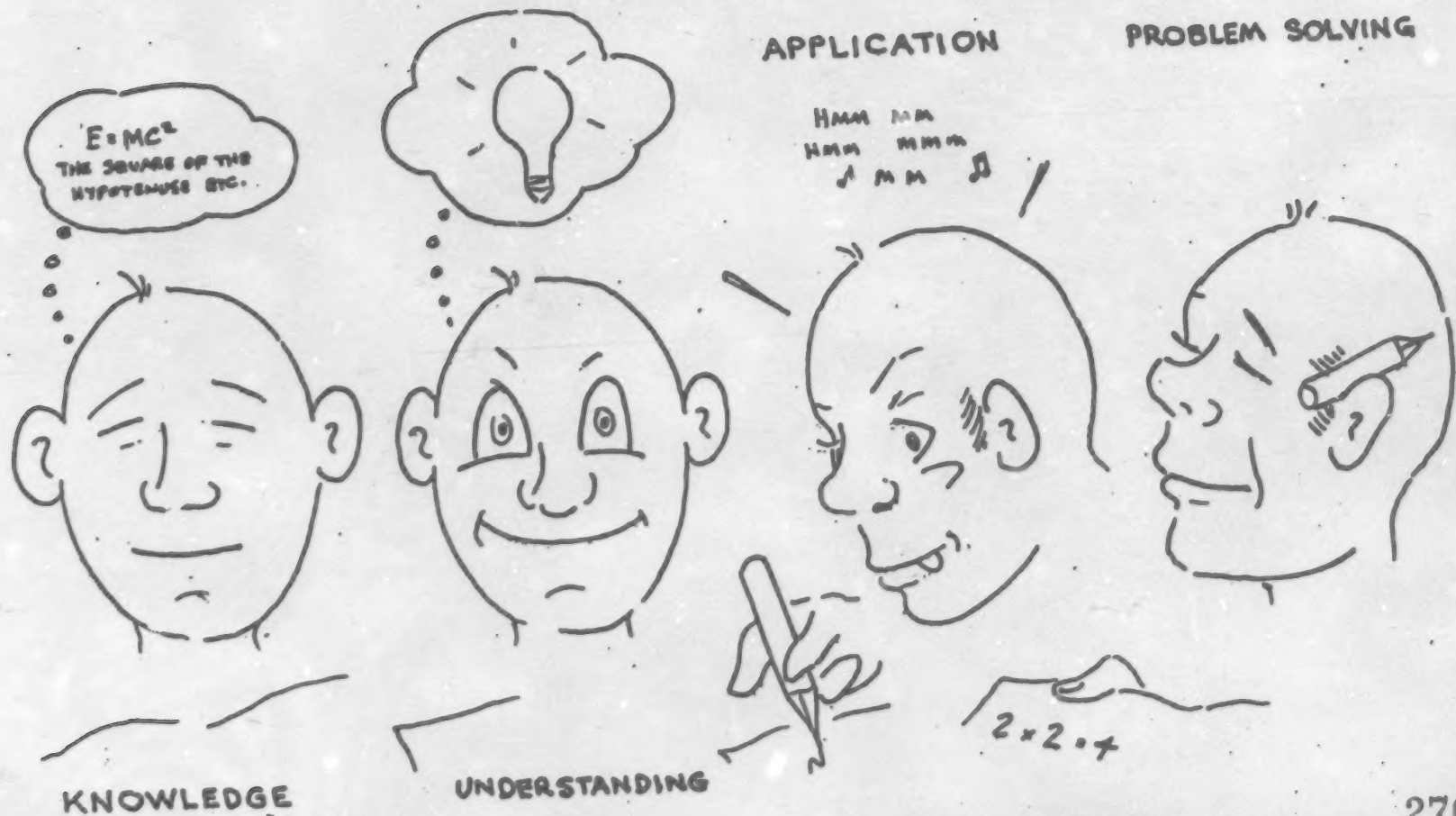
AFFECTIVE BEHAVIOR



PSYCHOMOTOR BEHAVIOR



COGNITIVE BEHAVIOR



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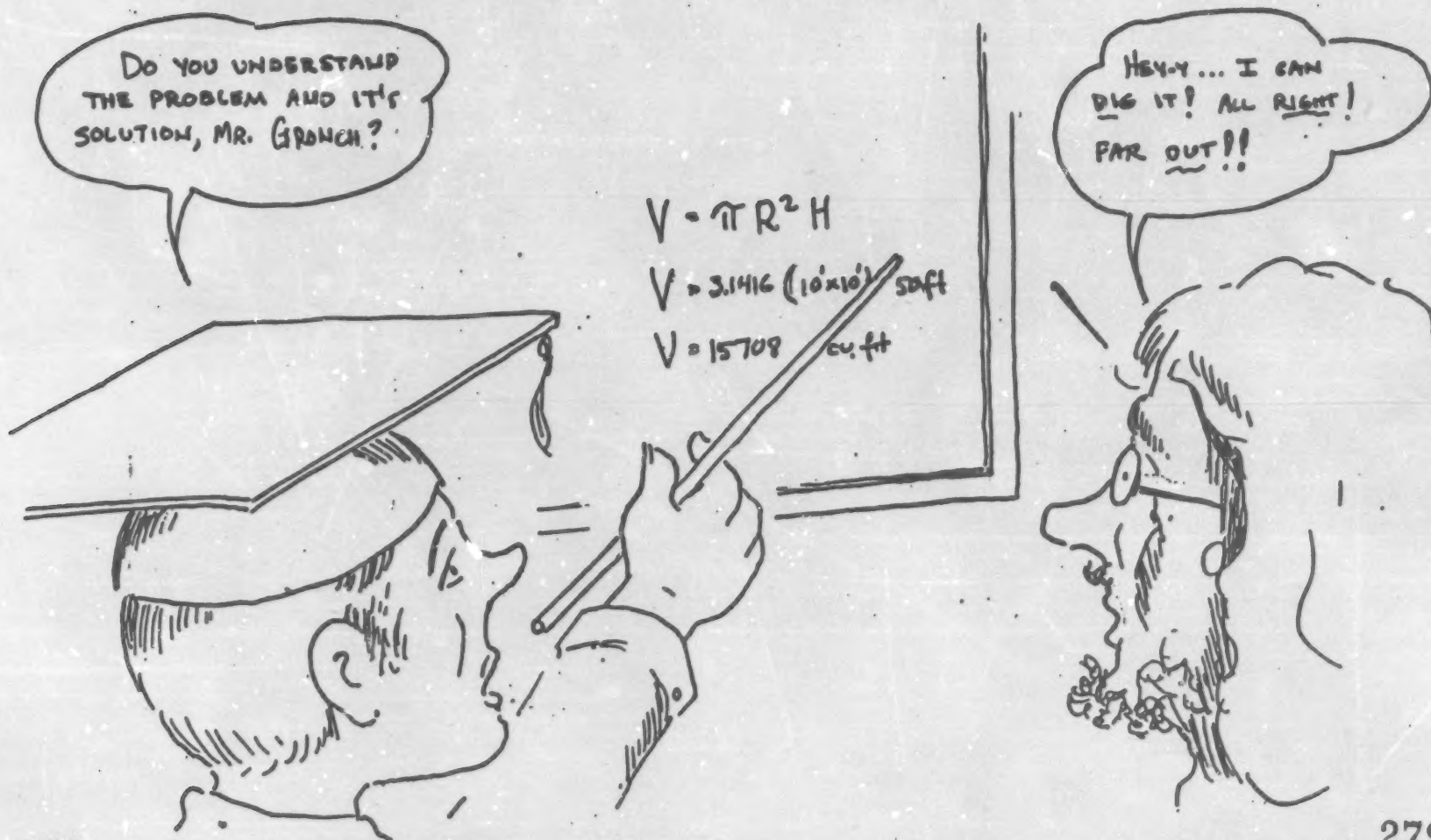
Fig. 4.8 Cognitive Behavior

COGNITIVE: KNOWLEDGE

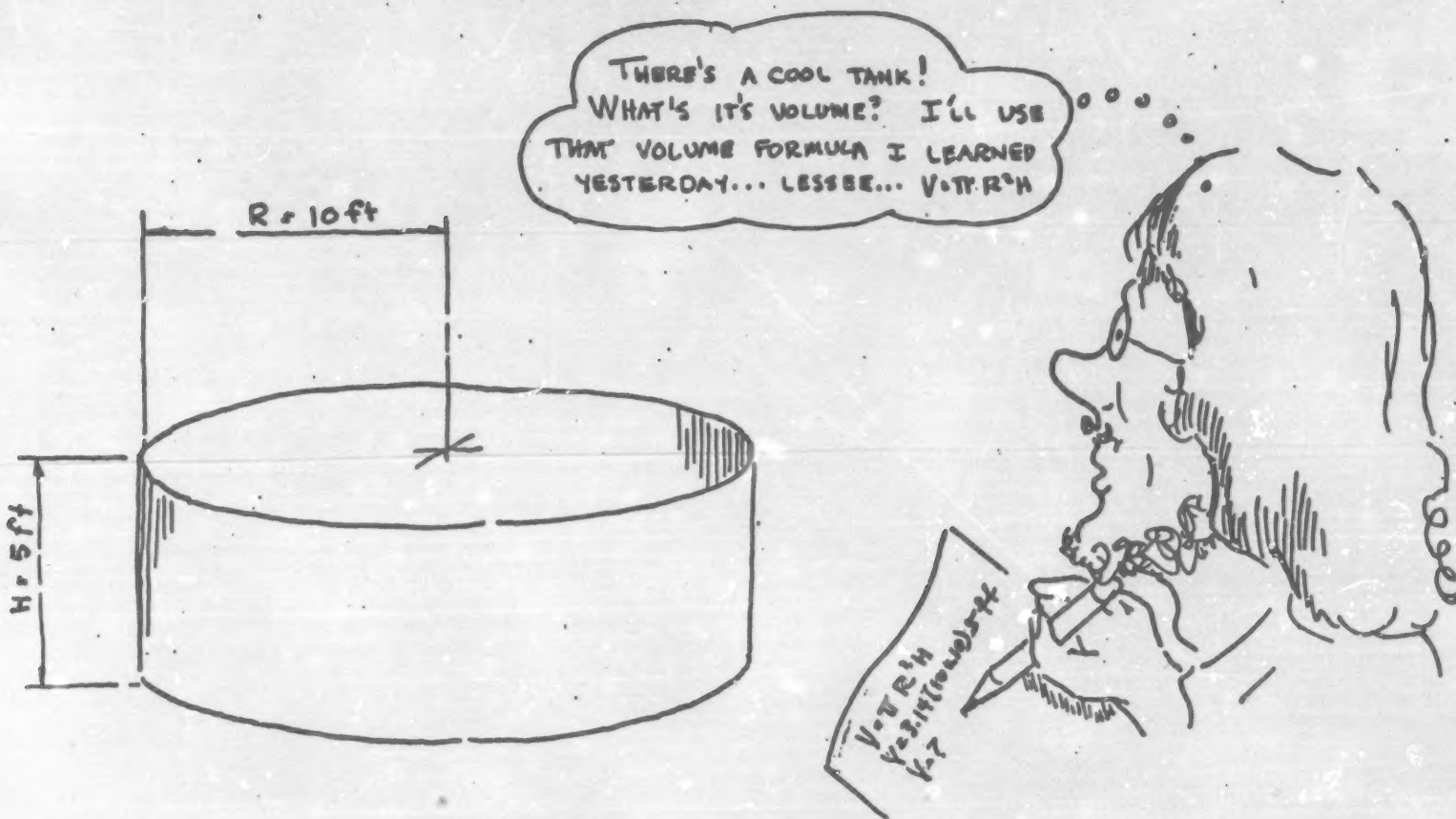


Fig. 4.9. Cognitive Knowledge

COGNITIVE: COMPREHENSION



COGNITIVE: APPLICATION



COGNITIVE: PROBLEM SOLVING



THE INSTRUCTIONAL DEVELOPMENT PROCESS

Analysis

Define
the Problem

Analyze
the Tasks

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Design

Specify
Instructional
Objectives

Determine
Evaluation
Activities

Development

Select
Instructional
Methods
and Media

Develop
Instructional
Strategies

Delivery and Revision

Deliver
Instruction

Evaluate
and Revise

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INSTRUCTIONAL OBJECTIVE

A statement that describes an intended outcome of instruction. It describes a proposed change in a learner and it gives a description of a specific behavior or performance.

VAGUE TERMS

KNOW

REALLY UNDERSTAND

UNDERSTAND

BELIEVE

APPRECIATE

HAVE FAITH IN

ENJOY

FULLY APPRECIATE

EXPLICIT BEHAVIORS

WRITE

COMPARE

LIST

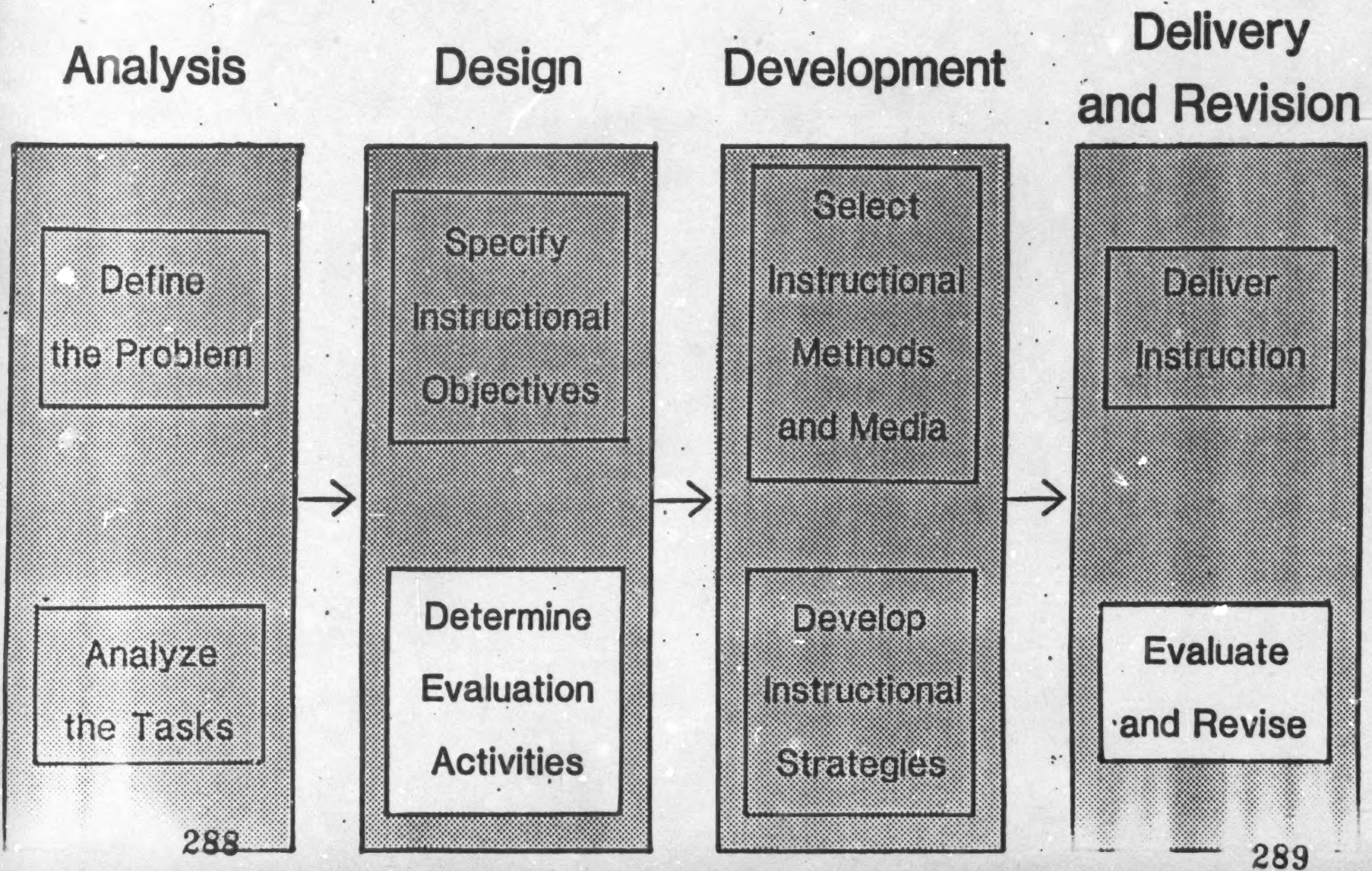
CONTRAST

SOLVE

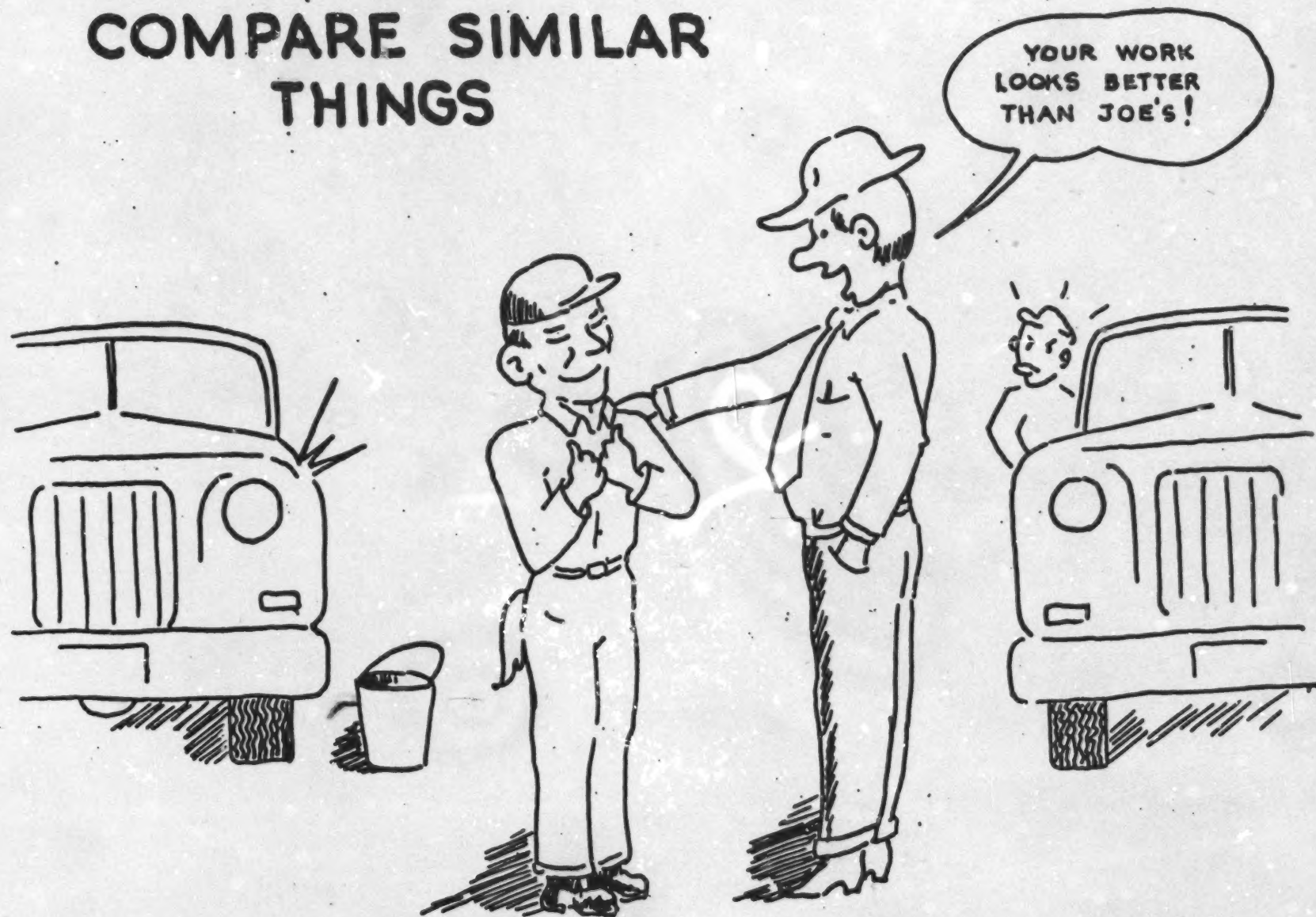
IDENTIFY BY
UNDERLINING

CONSTRUCT

THE INSTRUCTIONAL DEVELOPMENT PROCESS



COMPARE SIMILAR THINGS



COMPARE AGAINST A STANDARD

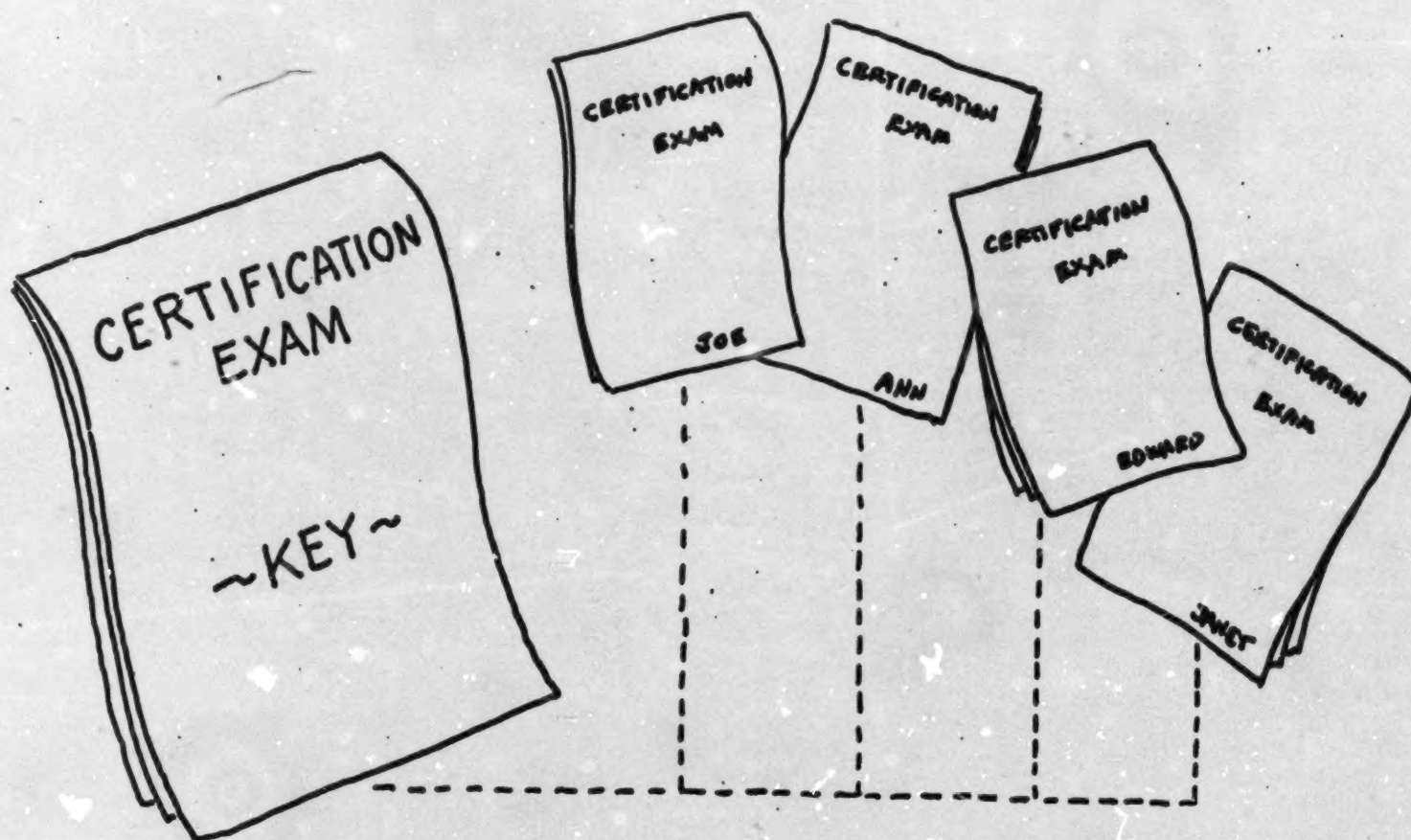
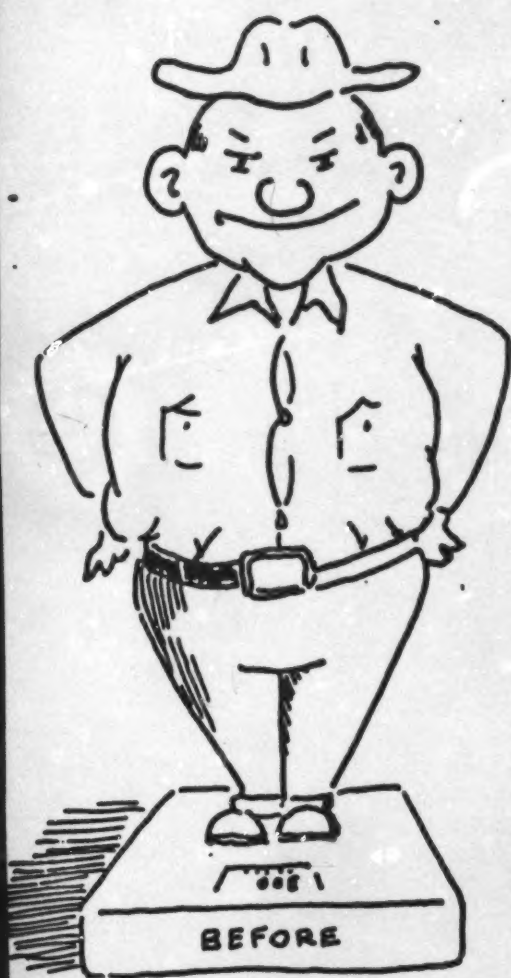


Figure 6.3 Compare Against a Standard

COMPARE BEFORE AND AFTER



20A

Figure 6.4 Compare Before and After

TRAINING RELATED USES OF EVALUATION

To determine existing
capabilities of employees

TRAINING RELATED USES OF EVALUATION

To provide feedback
to trainees

TRAINING RELATED USES OF EVALUATION

To provide practice
of a new skill

TRAINING RELATED USES OF EVALUATION

To certify
employee competencies

EVALUATIONS DIFFER ACCORDING TO:

WHO needs to know something?

WHAT is it they want to know?

WHY do they want to know it ?

WHEN do they want to know it?

HOW CERTAIN do they have to be about the results?

EXAMPLE CHECK LIST: FOCUSING THE MICROSCOPE

Directions: Check each item only if performed properly.

Check final square when each step has been performed properly and in correct sequence.

1. Snap low power objective into place ☐
2. Adjust mirror ☐
3. Assume starting point for focus ☐
4. Place slide on stage ☐
5. Adjust course adjustment screw to focus ☐
6. Change to high power ☐
7. Identify image on slide ☐
8. Correct sequence ☐

EXAMPLE RATING: WORKMANSHIP

Directions: Place an X on the line at the point which best describes this person on each dimension. You may check anywhere along the line.

1) Quality of work

Sloppy

Average

Excellent



2) Care of tools

Careless and
Disrespectful

Average

Excellent



THE INSTRUCTIONAL DEVELOPMENT PROCESS

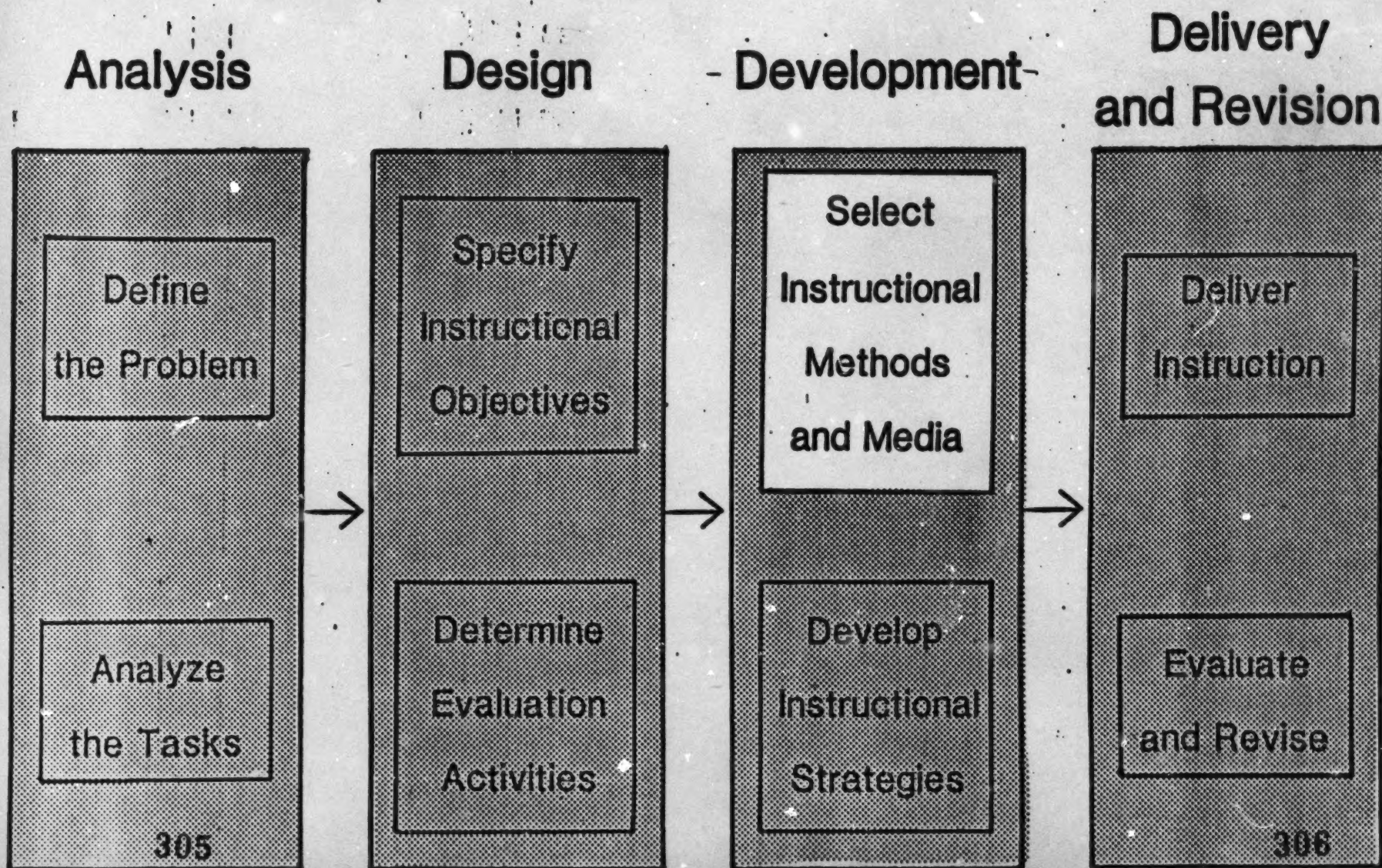


Fig. 7.1 - Select Methods & Media

TYPES OF INSTRUCTIONAL METHODS

Lecture



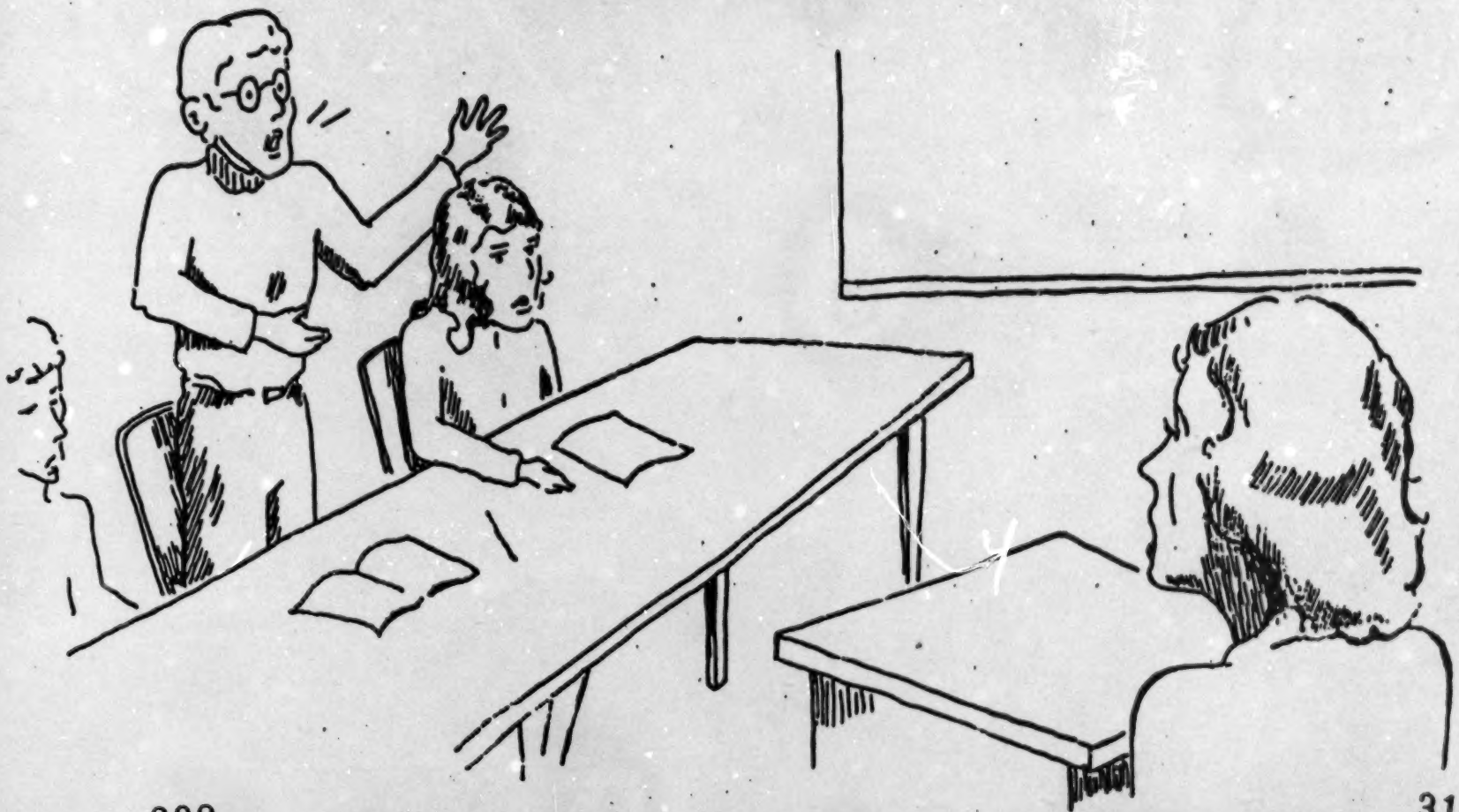
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Fig. 7.3 Lecture

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TYPES OF INSTRUCTIONAL METHODS

Guided Discussion



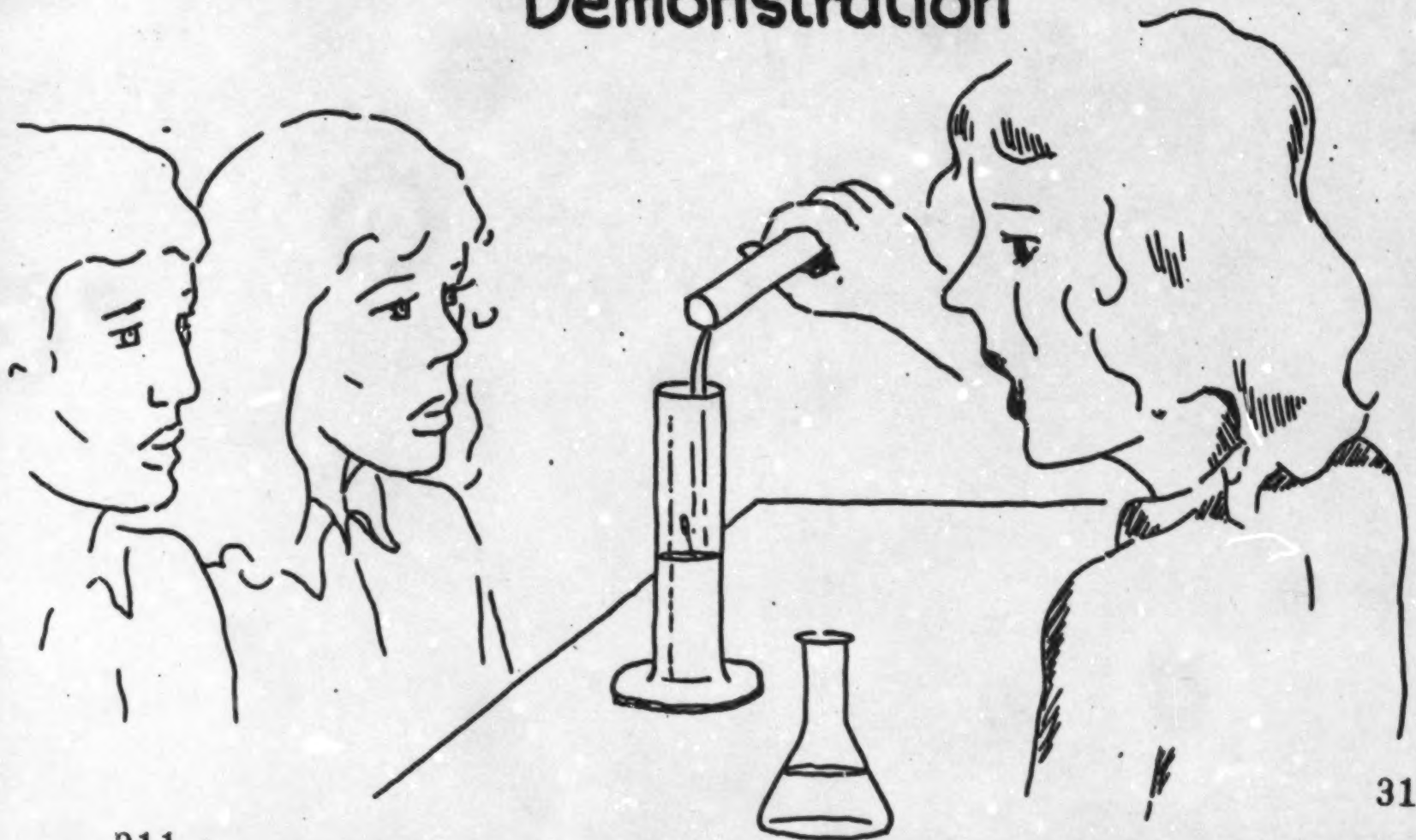
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Figure 7.4 Guided Discussion

TYPES OF INSTRUCTIONAL METHODS

Demonstration



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Figure 7.5 Demonstration

TYPES OF INSTRUCTIONAL METHODS

Individualized Instruction



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Fig. 7.6 Individualized Instruction

MEDIUM OF INSTRUCTION

A channel of communication through which instruction is presented to the learner

IRIS

Instructional Resources Information System

IRIS Abstract Contains the Following Information:

Accession Number

Publication Date

Title

Author(s)

Institution Where Prepared

Descriptors

Price of Copy

Descriptive Notes

ERIC Compilation

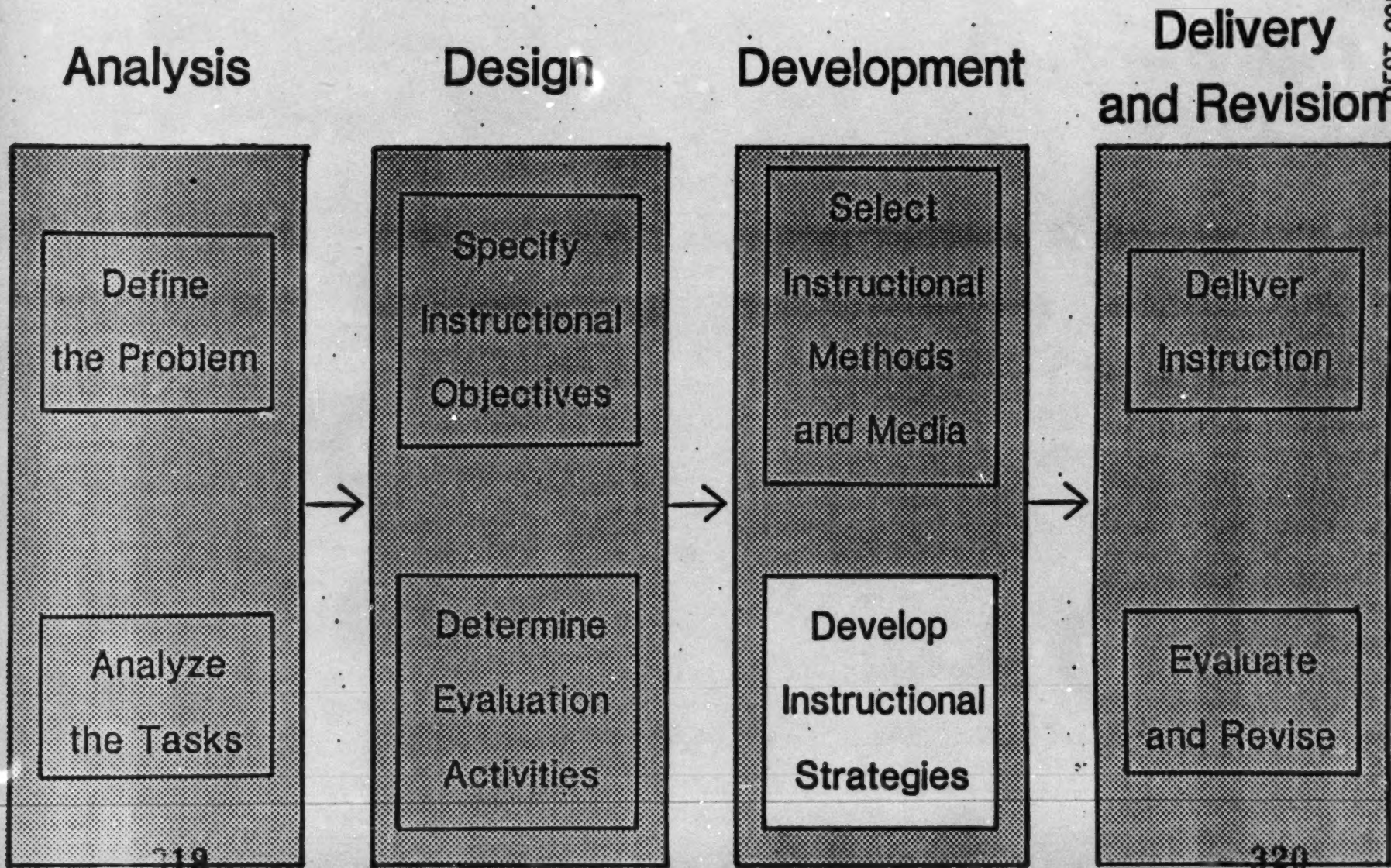
Abstract

COMMUNITY RESOURCES

- Water Plants
- Educational Institutions
- Libraries
- Trainees With Special Expertise
- Area Environmental Training Centers
- Special Interest Groups

THE INSTRUCTIONAL DEVELOPMENT PROCESS

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INSTRUCTIONAL PACKAGE WORKSHEET

Estimated Time:

Entering Competencies:

Justification:

Objective:

Evaluation Activities:

Resources:

Instructional Approach:

PURPOSE OF LESSON PLANNING

1. To get organized
2. To create a permanent record
3. To answer demands for accountability

COMPLETING AN IPW

- 1. Specify entering competencies**
- 2. Provide a justification for the objective**
- 3. Describe the instructional approach**
- 4. List the resources needed for the instructional activities**

INSTRUCTIONAL RESOURCES

For the instructor:

Content Outlines

Discussion Questions

Figures

Handouts

Films and Slides

Materials and Equipment

for demonstrations

For the trainees:

Readings

Exercises

Worksheets

Tests

Procedural Guides

INSTRUCTIONAL APPROACH

Instructional Methods are the source of Instructional Activities:

1. select methods
2. for each method identify all activities needed to implement the method
3. describe activities in terms of what the instructor will do

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